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# Ver 4.0
import pandas as pd
import numpy as np
from numpy import *
from mpl_toolkits.mplot3d import Axes3D
from matplotlib.pyplot import *
import matplotlib.pyplot as plt
from scipy.optimize import curve_fit
from scipy.interpolate import PchipInterpolator
from scipy.signal import savgol_filter
from prettytable import PrettyTable
from collections import namedtuple
import pandas_profiling
import cufflinks as cf
import plotly.offline

# Error elimination, since it does not affect the values obtained
# The graph is rendered in 3D, the package for this type of charts uses the square root
# The presence of a pair of negative numbers excludes their visualization
import warnings
warnings.filterwarnings("ignore", category=RuntimeWarning)

comments = [[0, 'All data presented in the SI system',
             'https://en.wikipedia.org/wiki/International_System_of_Units \n'],
            [1, 'Proton and neutron consist of a core \n and two shells around them \n',
             'Robert Hofstadter the Nobel laureate \n'],
            [2, 'The proton consists of two quarks \n "u" and a quark "d" \n',
             'Murray Gell-Mann the Nobel laureate, \n and George Zweig \n'],
            [3, 'The newneutron consists of two quarks \n "d" and a quark "u" \n',
             'Murray Gell-Mann the Nobel laureate, \n and George Zweig \n'],
            [4, '"Conditional quark" consists of a core and \n two shells \n',
             'The assumption of the author \n'],
            [5, 'Quark radius \n  "– (0.47 · 10E−16 cm)2 < RE2 < (0.43 · 10E−16 cm)2" \n',
             'https://arxiv.org/pdf/1604.01280.pdf \n'],
            [6, 'Proton, a neutron can be represented \n as the sum of three matrices \n',
             'The mathematical derivation of the author \n'],
            [7, '{x1, x2, x3, 0, 0} + {0, y1, y2, y3, 0} \n + {0, 0, x1, x2, x3} \n',
             'Or view of three matrices for obtaining \n a proton, neutron \n'],
            [8, 'x1, y1 - quark cores \n', "Usually, quarks proper in today's a view \n"],
            [9, '{x1, x2+y1, x3+y2+x1, y3+x2, x3} \n',
             'A schematic view of the matrix \n for a proton, neutron \n'],
            [10, '{x1, x2+y1, x3+y2+x1} - quark core \n', 'x1, y1 - quark cores \n'],
            [11, '{y3+x2, x3} - quark shells \n', 'x1, y1 - absent \n'],
            [12, 'The proposed approach allows one to obtain many \n different particles',
             'Calculation:quarks "u", "d", \n proton, neutron, newproton, newneutron \n'],
            [13, 'π = 3.14159265358979', 'https://en.wikipedia.org/wiki/Pi \n'],
            [14, "Planck's constant, h = 6.62607015E−34",
             'https://physics.nist.gov/cgi-bin/cuu/Value?h \n'],
            [15, 'Compton wavelength, λ = h/mc',
             'https://en.wikipedia.org/wiki/Compton_wavelength \n'],
            [16, 'Speed of light in a vacuum, c = 299792458',
             'https://physics.nist.gov/cgi-bin/cuu/Value?c \n'],
            [17, 'Electrical constant, ε0 = 8.8541878128E−12',
             'https://physics.nist.gov/cgi-bin/cuu/Value?ep0 \n'],
            [18, 'Gravitational constant, G = 6.67430E-11',
             'https://physics.nist.gov/cgi-bin/cuu/Value?bg \n'],
            [19, 'Electron diameter 10e−22, \n Nobel lecture, December, 8, 1989',
             'Hans D. Dehmelt Experiments with an \n isolated subatomic particle at rest \n'],
            [20, 'Electric charge of an electron -1.602176634e-19 \n',
             'https://physics.nist.gov/cgi-bin/cuu/Value?e \n'],
            [21, 'Electron mass', '9.1093837015e-31 \n']]

table1 = PrettyTable(['#', 'Description', 'Link to source/ comments'])
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for rec in comments:
    table1.add_row(rec)


class Preliminary():
# volume of newproton + newneutron
# Quark condensate provides about 9 percent of the newproton's mass
# Physical Review Letters, 2018, website arXiv.org

# V = 4/3πR**3
    π = 3.14159265358979

    Vy = 4/3 * π * (2.5E-16)**3
    Vs1 = 4/3 * π * (1.4E-15)**3
    Vs2 = 4/3 * π * (2.5E-15)**3
    Vs11 = Vs1 - Vy
    Vs21 = Vs2 -Vs11

# electron diameter 10e–22
# Nobel lecture, December, 8, 1989, Hans D. Dehmelt Experiments
# with an isolated subatomic particle at rest

    De = 10e-22
    Ve = 4/3 * π * (De/2)**3

# electron mass
    me = 9.1093837015e-31

# https://physics.nist.gov/cgi-bin/cuu/Value?mp - 1.67262192369E-27 kg.

    mps2 = 0.09 * 1.67262192369E-27/(Vs11/Vs21 +1)

# https://physics.nist.gov/cgi-bin/cuu/Value?mn - 1.67492749804E-27 kg.

    mns2 = 0.09 * 1.67492749804E-27/(Vs11/Vs21 +1)
    mps1 = 0.09 * 1.67262192369E-27 - mps2
    mns1 = 0.09 * 1.67492749804E-27 - mns2

class Newnewproton():
# The magnitude of the charge of the core, shells in the newproton, newneutron, respectively
#Robert Hofstadter the Nobel laureate

    SHELLSP1 = 0.35
    SHELLSP2 = 0.5
    SHELLSP3 = 0.15
    SHELLSN1 = 0.35
    SHELLSN2 = -0.5
    SHELLSN3 = 0.15

# The mass of the core, shells in the newproton, newneutron, respectively

    shellsmp1 = 1.67262192369E-27 * 0.91
    shellsmp2 = Preliminary.mps1
    shellsmp3 = Preliminary.mps2

    shellsmn1 = 1.67492749804E-27 * 0.91
    shellsmn2 = Preliminary.mns1
    shellsmn3 = Preliminary.mns2

    def __init__ (self, array):
        self.array = array

# Array input according to the matrix proposed by the author

a1 = array ([[2.0 , 1.0, 1.0, 1.0, 1.0, 0.0],
             [0.0, 1.0, 0.0, 0.0, 0.0, 0.0],
            [0.0, 0.0, 1.0, 0.0, 0.0, 0.0],
             [1.0, 1.0, 0.0, 2.0, 1.0, 1.0],
            [0.0, 0.0, 0.0, 0.0, 1.0, 0.0],
             [0.0, 0.0, 0.0, 0.0, 0.0, 1.0]])


unit = Newnewproton(a1)
unit.array

b1 = array ([Newnewproton.SHELLSP1, Newnewproton.SHELLSP2, Newnewproton.SHELLSP3,
             Newnewproton.SHELLSN1, Newnewproton.SHELLSN2,
             Newnewproton.SHELLSN3])

# The calculation of electric charges of quark "u" and "d"
# for each shells in electron charges

x1 = linalg.solve (unit.array, b1)

qvark = list(x1)

data1 = {'index': ['uq1', 'uq2', 'uq3', 'dq1', 'dq2', 'dq3'],
        'Qe': [ qvark[0], qvark[1],  qvark[2],  qvark[3],  qvark[4],  qvark[5]]}

uq1 = qvark[0]
uq2 = qvark[1]
uq3 = qvark[2]
dq1 = qvark[3]
dq2 = qvark[4]
dq3 = qvark[5]

shell = [[1, 'uq1', uq1], [2, 'uq2', uq2], [3, 'uq3', uq3],
         [4, 'dq1', dq1], [5, 'dq2', dq2], [6, 'dq3', dq3]]

table = PrettyTable(['#', 'Index', 'Charge in the Qe'])

for rec in shell:
    table.add_row(rec)

# Calculation of the amount of charge on the shells,
# charge of an electron is taken modulo

Qe = 1.602176634e-19
uq11 = Qe * qvark[0]
uq21 = Qe * qvark[1]
uq31 = Qe * qvark[2]
dq11 = Qe * qvark[3]
dq21 = Qe * qvark[4]
dq31 = Qe * qvark[5]

# The calculation of mass of quark "u" and "d" for each shells

b2 = array ([Newnewproton.shellsmp1, Newnewproton.shellsmp2,
             Newnewproton.shellsmp3, Newnewproton.shellsmn1,
             Newnewproton.shellsmn2, Newnewproton.shellsmn3])

x2 = linalg . solve (unit.array, b2)

qvarkm = list(x2)

data2 = {'index': ['um1', 'um2', 'um3', 'dm1', 'dm2', 'dm3'],
        'mass': [ qvarkm[0], qvarkm[1], qvarkm[2], qvarkm[3],
                 qvarkm[4], qvarkm[5]]}

um1 = qvarkm[0]
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um2 = qvarkm[1]
um3 = qvarkm[2]
dm1 = qvarkm[3]
dm2 = qvarkm[4]
dm3 = qvarkm[5]

# The calculation of volume of quark shells "u" and "d"

b3 = ([Preliminary.Vy, Preliminary.Vs11, Preliminary.Vs21, Preliminary.Vy,
       Preliminary.Vs11, Preliminary.Vs21])

x3 = linalg . solve (unit.array, b3)

qvarkv = list(x3)

data3 = {'index': ['uv1', 'uv2', 'uv3', 'dv1', 'dv2', 'dv3'],
        'mass': [ qvarkv[0], qvarkv[1], qvarkv[2], qvarkv[3],
                 qvarkv[4], qvarkv[5]]}

uv1 = qvarkv[0]
uv2 = qvarkv[1]
uv3 = qvarkv[2]
dv1 = qvarkv[3]
dv2 = qvarkv[4]
dv3 = qvarkv[5]

# Data entry for quarks "u" and "d"

data = {'Index "u"': ['uq11', 'um1', 'uv1', 'uq21', 'um2', 'uv2',
                      'uq31', 'um3', 'uv3'],
        'Value "u"': [ uq11,   um1,   uv1,   uq21,   um2,   uv2,
                      uq31,   um3,   uv3],
       'Index "d"': ['dq11', 'dm1', 'dv1', 'dq21', 'dm2', 'dv2','dq31',
                     'dm3', 'dv3'],
       'Value "d"': [ dq11,   dm1,   dv1,   dq21,   dm2,   dv2,  dq31,
                     dm3,   dv3]}


quarku = [[1, 'uq11', uq11, 'um1', um1, 'uv1', uv1],
         [2, 'uq21', uq21, 'um2', um2, 'uv2', uv2],
         [3, 'uq31', uq31, 'um3', um3, 'uv3', uv3]]

table2 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl', 'Mass sym.',
                      'Mass in kg.', 'Volume sym.', 'Volume in cbm'])

for rec in quarku:
    table2.add_row(rec)

quarkd = [[1, 'dq11', dq11, 'dm1', dm1, 'dv1', dv1],
         [2, 'dq21', dq21, 'dm2', dm2, 'dv2', dv2],
         [3, 'dq31', dq31, 'dm3', dm3, 'dv3', dv3]]

table3 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl', 'Mass sym.',
                      'Mass in kg.', 'Volume sym.', 'Volume in cbm'])

for rec in quarkd:
    table3.add_row(rec)


# Description for newproton, newneutron, by shells
# The top line - the center, the bottom line - the upper shell
# The presented interactions in date4 are the author's approach


newproton = [[1, 'pq1', uq11, 'pm1', um1, 'pv1', uv1],
         [2, 'pq2', uq21, 'pm2', um2, 'pv2', uv2],
         [3, 'pq3', dq11, 'pm3', dm1, 'pv3', dv1],
         [4, 'pq4', uq31, 'pm4', um3, 'pv4', uv3],
         [5, 'pq5', uq11, 'pm5', um1, 'pv5', uv1],
         [6, 'pq6', dq21, 'pm6', dm2, 'pv6', dv2],
         [7, 'pq7', dq31, 'pm7', dm3, 'pv7', dv3],
         [8, 'pq8', uq21, 'pm8', um2, 'pv8', uv2],
         [9, 'pq9', uq31, 'pm9', um3, 'pv9', uv3]]

table4 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl', 'Mass sym.',
                      'Mass in kg.', 'Volume sym.', 'Volume in cbm'])

for rec in newproton:
    table4.add_row(rec)

Pnewproton = namedtuple('Pnewproton',
                        'name1 charge name2 mass name3 volume')
newnewprotons = [Pnewproton('pq1', uq11, 'pm1', um1, 'pv1', uv1),
           Pnewproton('pq2', uq21, 'pm2', um2, 'pv2', uv2),
           Pnewproton('pq3', dq11, 'pm3', dm1, 'pv3', dv1),
           Pnewproton('pq4', uq31, 'pm4', um3, 'pv4', uv3),
           Pnewproton('pq5', uq11, 'pm5', um1, 'pv5', uv1),
           Pnewproton('pq6', dq21, 'pm6', dm2, 'pv6', dv2),
           Pnewproton('pq7', dq31, 'pm7', dm3, 'pv7', dv3),
           Pnewproton('pq8', uq21, 'pm8', um2, 'pv8', uv2),
           Pnewproton('pq9', uq31, 'pm9', um3, 'pv9', uv3)]


newneutron = [[1, 'nq1', dq11, 'nm1', dm1, 'nv1', dv1],
          [2, 'nq2', dq21, 'nm2', dm2, 'nv2', dv2],
          [3, 'nq3', uq11, 'nm3', um1, 'nv3', uv1],
          [4, 'nq4', dq31, 'nm4', dm3, 'nv4', dv3],
          [5, 'nq5', dq11, 'nm5', dm1, 'nv5', dv1],
          [6, 'nq6', uq21, 'nm6', um2, 'nv6', uv2],
          [7, 'nq7', uq31, 'nm7', um3, 'nv7', uv3],
          [8, 'nq8', dq21, 'nm8', dm2, 'nv8', dv2],
          [9, 'nq9', dq31, 'nm9', dm3, 'nv9', dv3]]

table5 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl',
                      'Mass sym.', 'Mass in kg.',
                      'Volume sym.', 'Volume in cbm'])

for rec in newneutron:
    table5.add_row(rec)

Nnewneutron = namedtuple('Nnewneutron',
                         'name1 charge name2 mass name3 volume')
newnewneutrons = [Nnewneutron('nq1', dq11, 'nm1', dm1, 'nv1', dv1),
            Nnewneutron('nq2', dq21, 'nm2', dm2, 'nv2', dv2),
            Nnewneutron('nq3', uq11, 'nm3', um1, 'nv3', uv1),
            Nnewneutron('nq4', dq31, 'nm4', dm3, 'nv4', dv3),
            Nnewneutron('nq5', dq11, 'nm5', dm1, 'nv5', dv1),
            Nnewneutron('nq6', uq21, 'nm6', um2, 'nv6', uv2),
            Nnewneutron('nq7', uq31, 'nm7', um3, 'nv7', uv3),
            Nnewneutron('nq8', dq21, 'nm8', dm2, 'nv8', dv2),
            Nnewneutron('nq9', dq31, 'nm9', dm3, 'nv9', dv3)]

class Pseudonewneutron():
# the difference from the class newproton in the matrix

    def __init__ (self, arr):
        self.arr = arr

# Array input according to the matrix proposed by the author
```

```
a2 = array ([[2.0 , 2.0, 1.0, 1.0, 0.0, 0.0],
             [0.0, 0.0, 1.0, 0.0, 1.0, 0.0],
             [0.0, 0.0, 0.0, 0.0, 0.0, 1.0],
             [1.0, 0.0, 0.0, 2.0, 2.0, 1.0],
             [0.0, 1.0, 0.0, 0.0, 0.0, 1.0],
             [0.0, 0.0, 1.0, 0.0, 0.0, 0.0]])


uni = Pseudonewneutron(a2)
uni.arr

x4 = linalg.solve(uni.arr, b1)
x5 = linalg.solve(uni.arr, b2)
x6 = linalg.solve(uni.arr, b3)

psqvark = list(x4)

psdata1 = {'index': ['psuq1', 'psuq2', 'psuq3', 'psdq1',
                     'psdq2', 'psdq3'],
           'Qe': [ psqvark[0], psqvark[1],  psqvark[2],
                  psqvark[3],  psqvark[4],
                  psqvark[5]]}

psuq1 = psqvark[0]
psuq2 = psqvark[1]
psuq3 = psqvark[2]
psdq1 = psqvark[3]
psdq2 = psqvark[4]
psdq3 = psqvark[5]

psshell = [[1, 'psuq1', psuq1], [2, 'psuq2', psuq2],
           [3, 'psuq3', uq3], [4, 'psdq1', psdq1],
           [5, 'psdq2', psdq2], [6, 'psdq3', psdq3]]

pstable = PrettyTable(['#', 'Index', 'Charge in the Qe'])

for rec in psshell:
    pstable.add_row(rec)

# Calculation of the amount of charge on the shells,
# charge of an electron is taken modulo

Qe = 1.602176634e-19
psuq11 = Qe * psqvark[0]
psuq21 = Qe * psqvark[1]
psuq31 = Qe * psqvark[2]
psdq11 = Qe * psqvark[3]
psdq21 = Qe * psqvark[4]
psdq31 = Qe * psqvark[5]

x4 = linalg.solve(uni.arr, b2)

psqvarkm = list(x4)

psdata2 = {'index': ['psum1', 'psum2', 'psum3', 'psdm1',
                     'psdm2', 'psdm3'],
           'mass': [ psqvarkm[0], psqvarkm[1],
                    psqvarkm[2], psqvarkm[3],
                    psqvarkm[4], psqvarkm[5]]}

psum1 = psqvarkm[0]
psum2 = psqvarkm[1]
psum3 = psqvarkm[2]
psdm1 = psqvarkm[3]
psdm2 = psqvarkm[4]
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psdm3 = psqvarkm[5]

x5 = linalg.solve(uni.arr, b3)

psqvarkv = list(x5)

psdata3 = {'index': ['psuv1', 'psuv2', 'psuv3', 'psdv1',
                     'psdv2', 'psdv3'],
           'mass': [ psqvarkv[0], psqvarkv[1],
                    psqvarkv[2], psqvarkv[3],
                    psqvarkv[4], psqvarkv[5]]}

psuv1 = psqvarkv[0]
psuv2 = psqvarkv[1]
psuv3 = psqvarkv[2]
psdv1 = psqvarkv[3]
psdv2 = psqvarkv[4]
psdv3 = psqvarkv[5]

# Data entry for quarks "u" and "d"

psdata = {'Index "u"': ['psuq11', 'psum1', 'psuv1', 'psuq21',
                        'psum2', 'psuv2', 'psuq31', 'psum3',
                        'psuv3'],
        'Value "u"': [ psuq11,   psum1,   psuv1,   psuq21,   psum2,
                      psuv2,    psuq31,   psum3,   psuv3],
       'Index "d"': ['psdq11', 'psdm1', 'psdv1', 'psdq21', 'psdm2',
                     'psdv2',  'psdq31', 'psdm3', 'psdv3'],
       'Value "d"': [ psdq11,   psdm1,   psdv1,   psdq21,   psdm2,
                     psdv2,     psdq31,   psdm3,   psdv3]}


psquarku = [[1, 'psuq11', psuq11, 'psum1', psum1, 'psuv1', psuv1],
            [2, 'psuq21', psuq21, 'psum2', psum2, 'psuv2', psuv2],
            [3, 'psuq31', psuq31, 'psum3', psum3, 'psuv3', psuv3]]

pstable2 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl', 'Mass sym.',
                        'Mass in kg.', 'Volume sym.', 'Volume in cbm'])

for rec in psquarku:
    pstable2.add_row(rec)

psquarkd = [[1, 'psdq11', psdq11, 'psdm1', psdm1, 'psdv1', psdv1],
            [2, 'psdq21', psdq21, 'psdm2', psdm2, 'psdv2', psdv2],
            [3, 'psdq31', psdq31, 'psdm3', psdm3, 'psdv3', psdv3]]

pstable3 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl', 'Mass sym.',
                        'Mass in kg.', 'Volume sym.', 'Volume in cbm'])

for rec in psquarkd:
    pstable3.add_row(rec)


# Description for psnewproton, psnewneutron, by shells
# The top line - the center, the bottom line - the upper shell
# The presented interactions in date4 are the author's approach


psnewproton = [[1, 'pspq1', psuq11, 'pspm1', psum1, 'pspv1', psuv1],
            [2, 'pspq2', psuq21, 'pspm2', psum2, 'pspv2', psuv2],
            [3, 'pspq3', psdq11, 'pspm3', psdm1, 'pspv3', psdv1],
            [4, 'pspq4', psuq31, 'pspm4', psum3, 'pspv4', psuv3],
            [5, 'pspq5', psuq11, 'pspm5', psum1, 'pspv5', psuv1],
            [6, 'pspq6', psdq21, 'pspm6', psdm2, 'pspv6', psdv2],
            [7, 'pspq7', psdq31, 'pspm7', psdm3, 'pspv7', psdv3],
            [8, 'pspq8', psuq21, 'pspm8', psum2, 'pspv8', psuv2],
            [9, 'pspq9', psuq31, 'pspm9', psum3, 'pspv9', psuv3]]

pstable4 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl', 'Mass sym.',
                      'Mass in kg.', 'Volume sym.', 'Volume in cbm'])

for rec in psnewproton:
    pstable4.add_row(rec)

Psnewproton = namedtuple('Psnewproton',
                         'name1 charge name2 mass name3 volume')
psnewnewprotons = [Psnewproton('pspq1', psuq11, 'pspm1', psum1, 'pspv1',
                               psuv1),
             Psnewproton('pspq2', psuq21, 'pspm2', psum2, 'pspv2', psuv2),
             Psnewproton('pspq3', psdq11, 'pspm3', psdm1, 'pspv3', psdv1),
             Psnewproton('pspq4', psuq31, 'pspm4', psum3, 'pspv4', psuv3),
             Psnewproton('pspq5', psuq11, 'pspm5', psum1, 'pspv5', psuv1),
             Psnewproton('pspq6', psdq21, 'pspm6', psdm2, 'pspv6', psdv2),
             Psnewproton('pspq7', psdq31, 'pspm7', psdm3, 'pspv7', psdv3),
             Psnewproton('pspq8', psuq21, 'pspm8', psum2, 'pspv8', psuv2),
             Psnewproton('pspq9', psuq31, 'pspm9', psum3, 'pspv9', psuv3)]


psnewneutron = [[1, 'psnq1', psdq11, 'psnm1', psdm1, 'psnv1', psdv1],
             [2, 'psnq2', psdq21, 'psnm2', psdm2, 'psnv2', psdv2],
             [3, 'psnq3', psuq11, 'psnm3', psum1, 'psnv3', psuv1],
             [4, 'psnq4', psdq31, 'psnm4', psdm3, 'psnv4', psdv3],
             [5, 'psnq5', psdq11, 'psnm5', psdm1, 'psnv5', psdv1],
             [6, 'psnq6', psuq21, 'psnm6', psum2, 'psnv6', psuv2],
             [7, 'psnq7', psuq31, 'psnm7', psum3, 'psnv7', psuv3],
             [8, 'psnq8', psdq21, 'psnm8', psdm2, 'psnv8', psdv2],
             [9, 'psnq9', psdq31, 'psnm9', psdm3, 'psnv9', psdv3]]

pstable5 = PrettyTable(['#', 'Charge sym.', 'Charge in Cl', 'Mass sym.',
                      'Mass in kg.', 'Volume sym.', 'Volume in cbm'])

for rec in psnewneutron:
    pstable5.add_row(rec)

Psnewneutron = namedtuple('Psnewneutron',
                          'name1 charge name2 mass name3 volume')
psnewnewneutrons = [Psnewneutron('psnq1', psdq11, 'psnm1', psdm1, 'psnv1',
                                 psdv1),
              Psnewneutron('psnq2', psdq21, 'psnm2', psdm2, 'psnv2', psdv2),
              Psnewneutron('psnq3', psuq11, 'psnm3', psum1, 'psnv3', psuv1),
              Psnewneutron('psnq4', psdq31, 'psnm4', psdm3, 'psnv4', psdv3),
              Psnewneutron('psnq5', psdq11, 'psnm5', psdm1, 'psnv5', psdv1),
              Psnewneutron('psnq6', psuq21, 'psnm6', psum2, 'psnv6', psuv2),
              Psnewneutron('psnq7', psuq31, 'psnm7', psum3, 'psnv7', psuv3),
              Psnewneutron('psnq8', psdq21, 'psnm8', psdm2, 'psnv8', psdv2),
              Psnewneutron('psnq9', psdq31, 'psnm9', psdm3, 'psnv9', psdv3)]


# Obtaining data for analysis

# calculation of wave parameters

# Compton wavelength
class Wavep():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458
```

```
# The ratio of Planck's constant to the speed of light in a vacuum, D

    D = CONSTANTH/CONSTANTC

    def __init__ (self, newcomptonlp):
        self.newcomptonlp = newcomptonlp


numbers = [1/newnewprotons[0].mass, 1/newnewprotons[1].mass,
           1/newnewprotons[2].mass, 1/newnewprotons[3].mass,
           1/newnewprotons[4].mass, 1/newnewprotons[5].mass,
           1/newnewprotons[6].mass, 1/newnewprotons[7].mass,
           1/newnewprotons[8].mass]
for i, item in enumerate(numbers):
       numbers[i] *= Wavep.D

unit2 = Wavep(numbers)

class Waven():

    def __init__ (self, newcomptonln):
        self.newcomptonln = newcomptonln


numbersn = [1/newnewneutrons[0].mass, 1/newnewneutrons[1].mass,
            1/newnewneutrons[2].mass, 1/newnewneutrons[3].mass,
            1/newnewneutrons[4].mass, 1/newnewneutrons[5].mass,
            1/newnewneutrons[6].mass, 1/newnewneutrons[7].mass,
            1/newnewneutrons[8].mass]
for i, item in enumerate(numbersn):
       numbersn[i] *= Wavep.D


unit3 = Waven(numbersn)

class Wavepsn():

    def __init__ (self, newcomptonlpsn):
        self.newcomptonlpsn = newcomptonlpsn


numberspsn = [1/psnewnewneutrons[0].mass,
              1/psnewnewneutrons[1].mass, 1/psnewnewneutrons[2].mass,
              1/psnewnewneutrons[3].mass,
              1/psnewnewneutrons[4].mass, 1/psnewnewneutrons[5].mass,
              1/psnewnewneutrons[6].mass,
              1/psnewnewneutrons[7].mass, 1/psnewnewneutrons[8].mass]
for i, item in enumerate(numberspsn):
       numberspsn[i] *= Wavep.D


unit4 = Wavepsn(numberspsn)

class Wavepsp():

    def __init__ (self, newcomptonlpsp):
        self.newcomptonlpsp = newcomptonlpsp


numberspsp = [1/psnewnewprotons[0].mass,
              1/psnewnewprotons[1].mass, 1/psnewnewprotons[2].mass,
              1/psnewnewprotons[3].mass,
              1/psnewnewprotons[4].mass, 1/psnewnewprotons[5].mass,
              1/psnewnewprotons[6].mass,
              1/psnewnewprotons[7].mass, 1/psnewnewprotons[8].mass]
for i, item in enumerate(numberspsp):
       numberspsp[i] *= Wavep.D


unit5 = Wavepsp(numberspsp)

#Electromagnetic characteristic of fine structure
class ElectricWavep():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The electrical constant ε
    CONSTANTE0 = 8.8541878128E-12

# The ratio to the unit of the doubled product of the electrical constant,
# Planck's constant, the speed of light in vacuum

    constantd = 1/(2 * CONSTANTE0 * CONSTANTH * CONSTANTC)

    def __init__ (self, newelektromagnetikp):
        self.newelektromagnetikp = newelektromagnetikp


numbers = [newnewprotons[0].charge **2, newnewprotons[1].charge **2,
           newnewprotons[2].charge **2,
           newnewprotons[3].charge **2, newnewprotons[4].charge **2,
           newnewprotons[5].charge **2,
           newnewprotons[6].charge **2, newnewprotons[7].charge **2,
           newnewprotons[8].charge **2]

for i, item in enumerate(numbers):
       numbers[i] *= ElectricWavep.constantd

unit6 = ElectricWavep(numbers)

class ElectricWaven():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The electrical constant ε
    CONSTANTE0 = 8.8541878128E-12

# The ratio to the unit of the doubled product of the electrical constant,
# Planck's constant, the speed of light in vacuum

    constantd = 1/(2 * CONSTANTE0 * CONSTANTH * CONSTANTC)

    def __init__ (self, newelektromagnetikn):
        self.newelektromagnetikn = newelektromagnetikn


numbers = [newnewneutrons[0].charge **2,
           newnewneutrons[1].charge **2, newnewneutrons[2].charge **2,
           newnewneutrons[3].charge **2,
           newnewneutrons[4].charge **2, newnewneutrons[5].charge **2,
           newnewneutrons[6].charge **2,
           newnewneutrons[7].charge **2, newnewneutrons[8].charge **2]

for i, item in enumerate(numbers):
       numbers[i] *= ElectricWaven.constantd

unit7 = ElectricWaven(numbers)

class ElectricWavepsn():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The electrical constant ε
    CONSTANTE0 = 8.8541878128E-12

# The ratio to the unit of the doubled product of the electrical constant,
# Planck's constant, the speed of light in vacuum

    constantd = 1/(2 * CONSTANTE0 * CONSTANTH * CONSTANTC)

    def __init__ (self, newelektromagnetikpsn):
        self.newelektromagnetikpsn = newelektromagnetikpsn


numbers = [psnewnewneutrons[0].charge **2,
           psnewnewneutrons[1].charge **2, psnewnewneutrons[2].charge **2,
           psnewnewneutrons[3].charge **2,
           psnewnewneutrons[4].charge **2, psnewnewneutrons[5].charge **2,
           psnewnewneutrons[6].charge **2,
           psnewnewneutrons[7].charge **2, psnewnewneutrons[8].charge **2]

for i, item in enumerate(numbers):
       numbers[i] *= ElectricWavepsn.constantd

unit8 = ElectricWavepsn(numbers)

class ElectricWavepsp():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The electrical constant ε
    CONSTANTE0 = 8.8541878128E-12

# The ratio to the unit of the doubled product of the electrical constant,
# Planck's constant, the speed of light in vacuum

    constantd = 1/(2 * CONSTANTE0 * CONSTANTH * CONSTANTC)

    def __init__ (self, newelektromagnetikpsp):
        self.newelektromagnetikpsp = newelektromagnetikpsp


numbers = [psnewnewprotons[0].charge **2,
           psnewnewprotons[1].charge **2, psnewnewprotons[2].charge **2,
           psnewnewprotons[3].charge **2,
           psnewnewprotons[4].charge **2, psnewnewprotons[5].charge **2,
           psnewnewprotons[6].charge **2,
           psnewnewprotons[7].charge **2, psnewnewprotons[8].charge **2]
```

```
for i, item in enumerate(numbers):
       numbers[i] *= ElectricWavepsp.constantd

unit9 = ElectricWavepsp(numbers)

# Gravity
class GravityWavep():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The Gravitational constant
    CONSTANTEG = 6.67430E-11

    π = 3.14159265358979

# The ratio of the doubled product of pi and the gravitational constant to
# Planck's constant, the speed of light in vacuum

    constantg = 2 * π * CONSTANTEG/(CONSTANTH * CONSTANTC)

    def __init__ (self, newgravp):
        self.newgravp = newgravp


numbers = [newnewprotons[0].mass **2, newnewprotons[1].mass **2,
           newnewprotons[2].mass **2, newnewprotons[3].mass **2,
           newnewprotons[4].mass **2, newnewprotons[5].mass **2,
           newnewprotons[6].mass **2, newnewprotons[7].mass **2,
           newnewprotons[8].mass **2]

for i, item in enumerate(numbers):
       numbers[i] *= GravityWavep.constantg

unit10 = GravityWavep(numbers)

class GravityWaven():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The Gravitational constant
    CONSTANTEG = 6.67430E-11

    π = 3.14159265358979

# The ratio of the doubled product of pi and the gravitational constant to
# Planck's constant, the speed of light in vacuum

    constantg = 2 * π * CONSTANTEG/(CONSTANTH * CONSTANTC)

    def __init__ (self, newgravn):
        self.newgravn = newgravn


numbers = [newnewneutrons[0].mass **2,
           newnewneutrons[1].mass **2, newnewneutrons[2].mass **2,
           newnewneutrons[3].mass **2,
           newnewneutrons[4].mass **2, newnewneutrons[5].mass **2,
           newnewneutrons[6].mass **2,
           newnewneutrons[7].mass **2, newnewneutrons[8].mass **2]

for i, item in enumerate(numbers):
       numbers[i] *= GravityWaven.constantg

unit11 = GravityWaven(numbers)

class GravityWavepsn():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The Gravitational constant
    CONSTANTEG = 6.67430E-11

    π = 3.14159265358979

# The ratio of the doubled product of pi and the gravitational constant to
# Planck's constant, the speed of light in vacuum

    constantg = 2 * π * CONSTANTEG/(CONSTANTH * CONSTANTC)

    def __init__ (self, newgravpsn):
        self.newgravpsn = newgravpsn


numbers = [psnewnewneutrons[0].mass **2,
           psnewnewneutrons[1].mass **2, psnewnewneutrons[2].mass **2,
           psnewnewneutrons[3].mass **2,
           psnewnewneutrons[4].mass **2, psnewnewneutrons[5].mass **2,
           psnewnewneutrons[6].mass **2,
           psnewnewneutrons[7].mass **2, psnewnewneutrons[8].mass **2]

for i, item in enumerate(numbers):
       numbers[i] *= GravityWavepsn.constantg

unit12 = GravityWavepsn(numbers)

class GravityWavepsp():

# Planck's constant
    CONSTANTH = 6.62607015E-34

# The speed of light in a vacuum
    CONSTANTC = 299792458

# The Gravitational constant
    CONSTANTEG = 6.67430E-11

    π = 3.14159265358979

# The ratio of the doubled product of pi and the gravitational constant to
# Planck's constant, the speed of light in vacuum

    constantg = 2 * π * CONSTANTEG/(CONSTANTH * CONSTANTC)

    def __init__ (self, newgravpsp):
        self.newgravpsp = newgravpsp
```

```
numbers = [psnewnewprotons[0].mass **2,
           psnewnewprotons[1].mass **2, psnewnewprotons[2].mass **2,
           psnewnewprotons[3].mass **2,
           psnewnewprotons[4].mass **2, psnewnewprotons[5].mass **2,
           psnewnewprotons[6].mass **2,
           psnewnewprotons[7].mass **2, psnewnewprotons[8].mass **2]

for i, item in enumerate(numbers):
       numbers[i] *= GravityWavepsp.constantg

unit13 = GravityWavepsp(numbers)

# Obtaining additional data for analysis
# Gravity
class Frequencyp():

# The speed of light in a vacuum
    CONSTANTC = 299792458


    def __init__ (self, newfrequencep):
        self.newfrequencep = newfrequencep


numbers = [1/unit2.newcomptonlp[0],
           1/unit2.newcomptonlp[1], 1/unit2.newcomptonlp[2],
           1/unit2.newcomptonlp[3],
           1/unit2.newcomptonlp[4], 1/unit2.newcomptonlp[5],
           1/unit2.newcomptonlp[6],
           1/unit2.newcomptonlp[7], 1/unit2.newcomptonlp[8]]

for i, item in enumerate(numbers):
       numbers[i] *= Frequencyp.CONSTANTC

unit14 = Frequencyp(numbers)

class Frequencyn():

# The speed of light in a vacuum
    CONSTANTC = 299792458


    def __init__ (self, newfrequencen):
        self.newfrequencen = newfrequencen


numbers = [1/unit3.newcomptonln[0],
           1/unit3.newcomptonln[1], 1/unit3.newcomptonln[2],
           1/unit3.newcomptonln[3],
           1/unit3.newcomptonln[4], 1/unit3.newcomptonln[5],
           1/unit3.newcomptonln[6],
           1/unit3.newcomptonln[7], 1/unit3.newcomptonln[8]]

for i, item in enumerate(numbers):
       numbers[i] *= Frequencyn.CONSTANTC

unit15 = Frequencyn(numbers)

class Frequencypsn():

# The speed of light in a vacuum
    CONSTANTC = 299792458

    def __init__ (self, newfrequencepsn):
        self.newfrequencepsn = newfrequencepsn
```

```
numbers = [1/unit4.newcomptonlpsn[0], 1/unit4.newcomptonlpsn[1],
           1/unit4.newcomptonlpsn[2], 1/unit4.newcomptonlpsn[3],
           1/unit4.newcomptonlpsn[4], 1/unit4.newcomptonlpsn[5],
           1/unit4.newcomptonlpsn[6], 1/unit4.newcomptonlpsn[7],
           1/unit4.newcomptonlpsn[8]]

for i, item in enumerate(numbers):
       numbers[i] *= Frequencypsn.CONSTANTC

unit16 = Frequencypsn(numbers)

class Frequencypsp():

# The speed of light in a vacuum
    CONSTANTC = 299792458

    def __init__ (self, newfrequencepsp):
        self.newfrequencepsp = newfrequencepsp


numbers = [1/unit5.newcomptonlpsp[0], 1/unit5.newcomptonlpsp[1],
           1/unit5.newcomptonlpsp[2], 1/unit5.newcomptonlpsp[3],
           1/unit5.newcomptonlpsp[4], 1/unit5.newcomptonlpsp[5],
           1/unit5.newcomptonlpsp[6], 1/unit5.newcomptonlpsp[7],
           1/unit5.newcomptonlpsp[8]]

for i, item in enumerate(numbers):
       numbers[i] *= Frequencypsp.CONSTANTC

unit17 = Frequencypsp(numbers)

# Preparing DataFrame based on basic calculations
data4 = {'Index "p"': ['charge1', 'mass1', 'volume1',
                       'charge2', 'mass2', 'volume2',
                       'charge3', 'mass3', 'volume3',
                       'charge4', 'mass4', 'volume4',
                       'charge5', 'mass5', 'volume5',
                       'charge6', 'mass6', 'volume6',
                       'charge7', 'mass7', 'volume7',
                       'charge8', 'mass8', 'volume8',
                       'charge9', 'mass9', 'volume9'],
        'Value "p"': [newnewprotons[0].charge,
                      newnewprotons[0].mass, newnewprotons[0].volume,
                      newnewprotons[1].charge, newnewprotons[1].mass,
                      newnewprotons[1].volume,
                      newnewprotons[2].charge, newnewprotons[2].mass,
                      newnewprotons[2].volume,
                      newnewprotons[3].charge, newnewprotons[3].mass,
                      newnewprotons[3].volume,
                      newnewprotons[4].charge, newnewprotons[4].mass,
                      newnewprotons[4].volume,
                      newnewprotons[5].charge, newnewprotons[5].mass,
                      newnewprotons[5].volume,
                      newnewprotons[6].charge, newnewprotons[6].mass,
                      newnewprotons[6].volume,
                      newnewprotons[7].charge, newnewprotons[7].mass,
                      newnewprotons[7].volume,
                      newnewprotons[8].charge, newnewprotons[8].mass,
                      newnewprotons[8].volume],

       'Index "n"': ['charge1', 'mass1', 'volume1',
                     'charge2', 'mass2', 'volume2',
                     'charge3', 'mass3', 'volume3',
                     'charge4', 'mass4', 'volume4',
                     'charge5', 'mass5', 'volume5',
                     'charge6', 'mass6', 'volume6',
                     'charge7', 'mass7', 'volume7',
                     'charge8', 'mass8', 'volume8',
                     'charge9', 'mass9', 'volume9'],
       'Value "n"': [ newnewneutrons[0].charge, newnewneutrons[0].mass,
                     newnewneutrons[0].volume,
                      newnewneutrons[1].charge, newnewneutrons[1].mass,
                     newnewneutrons[1].volume,
                      newnewneutrons[2].charge, newnewneutrons[2].mass,
                     newnewneutrons[2].volume,
                      newnewneutrons[3].charge, newnewneutrons[3].mass,
                     newnewneutrons[3].volume,
                      newnewneutrons[4].charge, newnewneutrons[4].mass,
                     newnewneutrons[4].volume,
                      newnewneutrons[5].charge, newnewneutrons[5].mass,
                     newnewneutrons[5].volume,
                      newnewneutrons[6].charge, newnewneutrons[6].mass,
                     newnewneutrons[6].volume,
                      newnewneutrons[7].charge, newnewneutrons[7].mass,
                     newnewneutrons[7].volume,
                      newnewneutrons[8].charge, newnewneutrons[8].mass,
                     newnewneutrons[8].volume],
       'Index "psp"': ['charge1', 'mass1', 'volume1',
                       'charge2', 'mass2', 'volume2',
                       'charge3', 'mass3', 'volume3',
                       'charge4', 'mass4', 'volume4',
                       'charge5', 'mass5', 'volume5',
                       'charge6', 'mass6', 'volume6',
                       'charge7', 'mass7', 'volume7',
                       'charge8', 'mass8', 'volume8',
                       'charge9', 'mass9', 'volume9'],
        'Value "psp"': [psnewnewprotons[0].charge, psnewnewprotons[0].mass,
                        psnewnewprotons[0].volume,
                        psnewnewprotons[1].charge, psnewnewprotons[1].mass,
                        psnewnewprotons[1].volume,
                        psnewnewprotons[2].charge, psnewnewprotons[2].mass,
                        psnewnewprotons[2].volume,
                        psnewnewprotons[3].charge, psnewnewprotons[3].mass,
                        psnewnewprotons[3].volume,
                        psnewnewprotons[4].charge, psnewnewprotons[4].mass,
                        psnewnewprotons[4].volume,
                        psnewnewprotons[5].charge, psnewnewprotons[5].mass,
                        psnewnewprotons[5].volume,
                        psnewnewprotons[6].charge, psnewnewprotons[6].mass,
                        psnewnewprotons[6].volume,
                        psnewnewprotons[7].charge, psnewnewprotons[7].mass,
                        psnewnewprotons[7].volume,
                        psnewnewprotons[8].charge, psnewnewprotons[8].mass,
                        psnewnewprotons[8].volume],

       'Index "psn"': ['charge1', 'mass1', 'volume1',
                       'charge2', 'mass2', 'volume2',
                       'charge3', 'mass3', 'volume3',
                       'charge4', 'mass4', 'volume4',
                       'charge5', 'mass5', 'volume5',
                       'charge6', 'mass6', 'volume6',
                       'charge7', 'mass7', 'volume7',
                       'charge8', 'mass8', 'volume8',
                       'charge9', 'mass9', 'volume9'],
       'Value "psn"': [psnewnewneutrons[0].charge, psnewnewneutrons[0].mass,
                       psnewnewneutrons[0].volume,
                       psnewnewneutrons[1].charge, psnewnewneutrons[1].mass,
                       psnewnewneutrons[1].volume,
                       psnewnewneutrons[2].charge, psnewnewneutrons[2].mass,
                       psnewnewneutrons[2].volume,
                       psnewnewneutrons[3].charge, psnewnewneutrons[3].mass,
                       psnewnewneutrons[3].volume,
                       psnewnewneutrons[4].charge, psnewnewneutrons[4].mass,
                       psnewnewneutrons[4].volume,
                       psnewnewneutrons[5].charge, psnewnewneutrons[5].mass,
                       psnewnewneutrons[5].volume,
                       psnewnewneutrons[6].charge, psnewnewneutrons[6].mass,
                       psnewnewneutrons[6].volume,
                       psnewnewneutrons[7].charge, psnewnewneutrons[7].mass,
                       psnewnewneutrons[7].volume,
                       psnewnewneutrons[8].charge, psnewnewneutrons[8].mass,
                       psnewnewneutrons[8].volume]}

df1 = pd.DataFrame.from_dict(data4)

data5 = {'Index "deltanp"': ['dmass1', 'dmass2', 'dmass3',
                             'dmass4', 'dmass5', 'dmass6',
                             'dmass7', 'dmass8', 'dmass9'],
        'Value "deltanp"': [newnewneutrons[0].mass-newnewprotons[0].mass,
                            newnewneutrons[1].mass-newnewprotons[1].mass,
                            newnewneutrons[2].mass-newnewprotons[2].mass,
                            newnewneutrons[3].mass-newnewprotons[3].mass,
                            newnewneutrons[4].mass-newnewprotons[4].mass,
                            newnewneutrons[5].mass-newnewprotons[5].mass,
                            newnewneutrons[6].mass-newnewprotons[6].mass,
                            newnewneutrons[7].mass-newnewprotons[7].mass,
                            newnewneutrons[8].mass-newnewprotons[8].mass],

       'Index "deltapsnp"': ['mass1', 'mass2', 'mass3',
                             'mass4', 'mass5', 'mass6',
                             'mass7', 'mass8', 'mass9'],
       'Value "deltapsnp"': [psnewnewneutrons[0].mass -psnewnewprotons[0].mass,
                             psnewnewneutrons[1].mass -psnewnewprotons[1].mass,
                             psnewnewneutrons[2].mass -psnewnewprotons[2].mass,
                             psnewnewneutrons[3].mass -psnewnewprotons[3].mass,
                             psnewnewneutrons[4].mass -psnewnewprotons[4].mass,
                             psnewnewneutrons[5].mass -psnewnewprotons[5].mass,
                             psnewnewneutrons[6].mass -psnewnewprotons[6].mass,
                             psnewnewneutrons[7].mass -psnewnewprotons[7].mass,
                             psnewnewneutrons[8].mass -psnewnewprotons[8].mass],
         'Index "chargep"': ['chargep1', 'chargep2', 'chargep3', 'chargep4',
                             'chargep5', 'chargep6', 'chargep7', 'chargep8',
                             'chargep9'],
        'Value "chargep"': [newnewprotons[0].charge, newnewprotons[1].charge,
                            newnewprotons[2].charge,
                            newnewprotons[3].charge, newnewprotons[4].charge,
                            newnewprotons[5].charge,
                            newnewprotons[6].charge, newnewprotons[7].charge,
                            newnewprotons[8].charge],
        'Index "volumep"': ['volumep1', 'volumep2', 'volumep3', 'volumep4',
                            'volumep5',
                            'volumep6', 'volumep7', 'volumep8', 'volumep9'],
        'Value "volumep"': [newnewprotons[0].volume, newnewprotons[1].volume,
                            newnewprotons[2].volume,
                            newnewprotons[3].volume, newnewprotons[4].volume,
                            newnewprotons[5].volume,
                            newnewprotons[6].volume, newnewprotons[7].volume,
                            newnewprotons[8].volume],
        'Index "massp"': ['massp1', 'massp2', 'massp3', 'massp4', 'massp5',
                          'massp6',
                          'massp7', 'massp8', 'massp9'],
        'Value "massp"': [newnewprotons[0].mass, newnewprotons[1].mass,
                          newnewprotons[2].mass, newnewprotons[3].mass,
                          newnewprotons[4].mass, newnewprotons[5].mass,
                          newnewprotons[6].mass, newnewprotons[7].mass,
                          newnewprotons[8].mass],
        'Index "chargen"': ['chargen1', 'chargen2', 'chargen3', 'chargen4',
                            'chargen5',
                            'chargen6', 'chargen7', 'chargen8', 'chargen9'],
        'Value "chargen"': [newnewneutrons[0].charge, newnewneutrons[1].charge,
                            newnewneutrons[2].charge,
                            newnewneutrons[3].charge, newnewneutrons[4].charge,
                            newnewneutrons[5].charge,
                            newnewneutrons[6].charge, newnewneutrons[7].charge,
                            newnewneutrons[8].charge],
        'Index "volumen"': ['volumen1', 'volumen2', 'volumen3', 'volumen4',
                            'volumen5',
                            'volumen6', 'volumen7', 'volumen8', 'volumen9'],
        'Value "volumen"': [newnewneutrons[0].volume, newnewneutrons[1].volume,
                            newnewneutrons[2].volume,
                            newnewneutrons[3].volume, newnewneutrons[4].volume,
                            newnewneutrons[5].volume,
                            newnewneutrons[6].volume, newnewneutrons[7].volume,
                            newnewneutrons[8].volume],
        'Index "massn"': ['massn1', 'massn2', 'massn3', 'massn4', 'massn5',
                          'massn6', 'massn7', 'massn8', 'massn9'],
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                          newnewneutrons[2].mass, newnewneutrons[3].mass,
                          newnewneutrons[4].mass, newnewneutrons[5].mass,
                          newnewneutrons[6].mass, newnewneutrons[7].mass,
                          newnewneutrons[8].mass],
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                              'chargepsp7', 'chargepsp8', 'chargepsp9'],
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                              psnewnewprotons[4].charge, psnewnewprotons[5].charge,
                              psnewnewprotons[6].charge,
                              psnewnewprotons[7].charge, psnewnewprotons[8].charge],
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                              psnewnewprotons[4].volume, psnewnewprotons[5].volume,
                              psnewnewprotons[6].volume,
                              psnewnewprotons[7].volume, psnewnewprotons[8].volume],
        'Index "masspsp"': ['masspsp1', 'masspsp2', 'masspsp3',
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                            'masspsp7', 'masspsp8', 'masspsp9'],
        'Value "masspsp"': [psnewnewprotons[0].mass,
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                            psnewnewprotons[3].mass,
                            psnewnewprotons[4].mass, psnewnewprotons[5].mass,
                            psnewnewprotons[6].mass,
                            psnewnewprotons[7].mass, psnewnewprotons[8].mass],
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                              'chargepsn7', 'chargepsn8', 'chargepsn9'],
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                              psnewnewneutrons[3].charge,
                              psnewnewneutrons[4].charge, psnewnewneutrons[5].charge,
                              psnewnewneutrons[6].charge,
                              psnewnewneutrons[7].charge, psnewnewneutrons[8].charge],
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                              psnewnewneutrons[3].volume,
                              psnewnewneutrons[4].volume, psnewnewneutrons[5].volume,
                              psnewnewneutrons[6].volume,
                              psnewnewneutrons[7].volume, psnewnewneutrons[8].volume],
        'Index "masspsn"': ['masspsn1', 'masspsn2', 'masspsn3',
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                            psnewnewneutrons[3].mass,
                            psnewnewneutrons[4].mass, psnewnewneutrons[5].mass,
                            psnewnewneutrons[6].mass,
                            psnewnewneutrons[7].mass, psnewnewneutrons[8].mass],
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                                 'newcomptonln7', 'newcomptonln8', 'newcomptonln9'],
        'Value "newcomptonln"': [unit3.newcomptonln[0], unit3.newcomptonln[1],
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                              unit3.newcomptonln[6], unit3.newcomptonln[7],
                                 unit3.newcomptonln[8]],
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                                        'newelektromagnetikn6',
                                    'newelektromagnetikn7', 'newelektromagnetikn8',
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        'Value "newelektromagnetikn"': [unit7.newelektromagnetikn[0],
                                        unit7.newelektromagnetikn[1],
                                     unit7.newelektromagnetikn[2],
                                        unit7.newelektromagnetikn[3],
                                     unit7.newelektromagnetikn[4],
                                        unit7.newelektromagnetikn[5],
                                     unit7.newelektromagnetikn[6],
                                        unit7.newelektromagnetikn[7],
                                     unit7.newelektromagnetikn[8]],
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        'Value "newgravn"': [unit11.newgravn[0], unit11.newgravn[1],
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                          unit11.newgravn[4], unit11.newgravn[5],
                             unit11.newgravn[6], unit11.newgravn[7],
                          unit11.newgravn[8]],
        'Index "newcomptonlp"': ['newcomptonlp1', 'newcomptonlp2',
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                             'newcomptonlp6', 'newcomptonlp7',
                                 'newcomptonlp8', 'newcomptonlp9'],
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                                 unit2.newcomptonlp[2],
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                                 unit2.newcomptonlp[4],
                                 unit2.newcomptonlp[5],
                              unit2.newcomptonlp[6],
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                                 unit2.newcomptonlp[8]],
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                                        'newelektromagnetikp9'],
        'Value "newelektromagnetikp"': [unit6.newelektromagnetikp[0],
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                                     unit6.newelektromagnetikp[6],
                                        unit6.newelektromagnetikp[7],
                                     unit6.newelektromagnetikp[8]],
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                             unit10.newgravp[6], unit10.newgravp[7],
                          unit10.newgravp[8]],
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                               'newfrequencen9'],
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                                  unit15.newfrequencen[2],
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                                  unit15.newfrequencen[4],
                                  unit15.newfrequencen[5],
                               unit15.newfrequencen[6],
                                  unit15.newfrequencen[7],
                                  unit15.newfrequencen[8]],
        'Index "newfrequencep"': ['newfrequencep1', 'newfrequencep2',
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                                  'newfrequencep7', 'newfrequencep8',
                               'newfrequencep9'],
        'Value "newfrequencep"': [unit14.newfrequencep[0],
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                                  unit14.newfrequencep[2],
                               unit14.newfrequencep[3],
                                  unit14.newfrequencep[4],
                                  unit14.newfrequencep[5],
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                                  unit14.newfrequencep[7],
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                                   'newcomptonlpsn7', 'newcomptonlpsn8',
                                'newcomptonlpsn9'],
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                                   unit4.newcomptonlpsn[2],
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                                   unit4.newcomptonlpsn[4],
                                   unit4.newcomptonlpsn[5],
                                unit4.newcomptonlpsn[6],
                                   unit4.newcomptonlpsn[7],
                                   unit4.newcomptonlpsn[8]],
        'Index "newelektromagnetikpsn"': ['newelektromagnetikpsn1',
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                                       'newelektromagnetikpsn3',
                                          'newelektromagnetikpsn4',
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                                          'newelektromagnetikpsn6',
                                       'newelektromagnetikpsn7',
                                          'newelektromagnetikpsn8',
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        'Value "newelektromagnetikpsn"': [unit8.newelektromagnetikpsn[0],
                                          unit8.newelektromagnetikpsn[1],
                                       unit8.newelektromagnetikpsn[2],
                                          unit8.newelektromagnetikpsn[3],
                                       unit8.newelektromagnetikpsn[4],
                                          unit8.newelektromagnetikpsn[5],
                                       unit8.newelektromagnetikpsn[6],
                                          unit8.newelektromagnetikpsn[7],
                                       unit8.newelektromagnetikpsn[8]],
        'Index "newgravpsn"': ['newgravpsn1', 'newgravpsn2', 'newgravpsn3',
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                            'newgravpsn7', 'newgravpsn8', 'newgravpsn9'],
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                               unit12.newgravpsn[2],
                            unit12.newgravpsn[3], unit12.newgravpsn[4],
                               unit12.newgravpsn[5],
                            unit12.newgravpsn[6], unit12.newgravpsn[7],
                               unit12.newgravpsn[8]],
        'Index "newcomptonlpsp"': ['newcomptonlpsp1', 'newcomptonlpsp2',
                                   'newcomptonlpsp3', 'newcomptonlpsp4',
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                                   'newcomptonlpsp7', 'newcomptonlpsp8',
                                'newcomptonlpsp9'],
        'Value "newcomptonlpsp"': [unit5.newcomptonlpsp[0],
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                                   unit5.newcomptonlpsp[2],
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                                   unit5.newcomptonlpsp[4],
                                   unit5.newcomptonlpsp[5],
                                unit5.newcomptonlpsp[6],
                                   unit5.newcomptonlpsp[7],
                                   unit5.newcomptonlpsp[8]],
        'Index "newelektromagnetikpsp"': ['newelektromagnetikpsp1',
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                                          unit9.newelektromagnetikpsp[1],
                                       unit9.newelektromagnetikpsp[2],
                                          unit9.newelektromagnetikpsp[3],
                                       unit9.newelektromagnetikpsp[4],
                                          unit9.newelektromagnetikpsp[5],
                                       unit9.newelektromagnetikpsp[6],
                                          unit9.newelektromagnetikpsp[7],
                                       unit9.newelektromagnetikpsp[8]],
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                               'newgravpsp4', 'newgravpsp5', 'newgravpsp6',
                            'newgravpsp7', 'newgravpsp8', 'newgravpsp9'],
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                               unit13.newgravpsp[2],
                            unit13.newgravpsp[3], unit13.newgravpsp[4],
                               unit13.newgravpsp[5],
                            unit13.newgravpsp[6], unit13.newgravpsp[7],
                               unit13.newgravpsp[8]],
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                                 'newfrequencepsn9'],
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                                 unit16.newfrequencepsn[4],
                                    unit16.newfrequencepsn[5],
                                 unit16.newfrequencepsn[6],
                                    unit16.newfrequencepsn[7],
                                 unit16.newfrequencepsn[8]],
        'Index "newfrequencepsp"': ['newfrequencepsp1', 'newfrequencepsp2',
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                                    'newfrequencepsp7', 'newfrequencepsp8',
                                 'newfrequencepsp9'],
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                                    unit17.newfrequencepsp[3],
                                 unit17.newfrequencepsp[4],
                                    unit17.newfrequencepsp[5],
                                 unit17.newfrequencepsp[6],
                                    unit17.newfrequencepsp[7],
                                 unit17.newfrequencepsp[8]]}

df2 = pd.DataFrame.from_dict(data5)


# The Calculation of the existence of a point charged particle with
# a charge 60 times less than the charge of an electron

# Minimum charge amount:

# in newproton
newnewprotons_min_charge = min(data5['Value "chargep"'], key=abs)

# in newneutron
newnewneutrons_min_charge = min(data5['Value "chargen"'], key=abs)

# in pseudo newproton
protopsns_min_charge = min(data5['Value "chargepsp"'], key=abs)

# in pseudo newneutron
neutropsns_min_charge = min(data5['Value "chargepsn"'], key=abs)

class Melectron():

    def __init__ (self, melectron_charge_amount, melectron_mass_amount,
                  melectron_volume_amount):
        self.melectron_charge_amount = melectron_charge_amount
        self.melectron_mass_amount = melectron_mass_amount
        self.melectron_volume_amount = melectron_volume_amount

# Let's compare the minimum values of charges in a new proton, new neutron,
# neutron, proton and
# find the value of a point charged particle
```

```
if (newnewprotons_min_charge == newnewneutrons_min_charge and newnewprotons_min_charge <
    protopsns_min_charge == neutropsns_min_charge):
    for i in range(9):
        melectron_charge_amount = (newnewprotons[i].charge/newnewprotons_min_charge -
                                   newnewprotons[i].charge//newnewprotons_min_charge)
        melectron_charge_amount = round(melectron_charge_amount * newnewprotons_min_charge, 28)

# find the mass of a point charged particle

# Qe - electron charge modulo

melectron_mass_amount = Preliminary.me/(Qe/melectron_charge_amount)


# minimum_volume_amount particles
melectron_volume_amount = Preliminary.Ve/(Qe/melectron_charge_amount)


unit18 = Melectron(melectron_charge_amount, melectron_mass_amount, melectron_volume_amount)

# The movement of charged particles is taken into account, only
if around((newnewprotons[0].charge +  newnewprotons[1].charge +\
           newnewprotons[2].charge + newnewprotons[3].charge + newnewprotons[4].charge),\
          1) == around((newnewprotons[6].charge + newnewprotons[7].charge + \
                        newnewprotons[8].charge), 1):

    class NewnewprotonCycles():
        def __init__ (self, newnewprotons_charge_amount12, newnewprotons_charge_amount22,
                      newnewprotons_charge_amount32, newnewprotons_charge_amount42,
                      newnewprotons_charge_amount52, newnewprotons_charge_amount62,
                      newnewprotons_charge_amount72, newnewprotons_charge_amount82,
                      newnewprotons_charge_amount92,

                      newnewprotons_charge_amount13, newnewprotons_charge_amount23,
                      newnewprotons_charge_amount33, newnewprotons_charge_amount43,
                      newnewprotons_charge_amount53, newnewprotons_charge_amount63,
                      newnewprotons_charge_amount73, newnewprotons_charge_amount83,
                      newnewprotons_charge_amount93,

                      newnewprotons_charge_amount14, newnewprotons_charge_amount24,
                      newnewprotons_charge_amount34, newnewprotons_charge_amount44,
                      newnewprotons_charge_amount54, newnewprotons_charge_amount64,
                      newnewprotons_charge_amount74, newnewprotons_charge_amount84,
                      newnewprotons_charge_amount94,

                      newnewprotons_mass_amount12, newnewprotons_mass_amount22,
                      newnewprotons_mass_amount32, newnewprotons_mass_amount42,
                      newnewprotons_mass_amount52, newnewprotons_mass_amount62,
                      newnewprotons_mass_amount72, newnewprotons_mass_amount82,
                      newnewprotons_mass_amount92,

                      newnewprotons_mass_amount13, newnewprotons_mass_amount23,
                      newnewprotons_mass_amount33, newnewprotons_mass_amount43,
                      newnewprotons_mass_amount53, newnewprotons_mass_amount63,
                      newnewprotons_mass_amount73, newnewprotons_mass_amount83,
                      newnewprotons_mass_amount93,

                      newnewprotons_mass_amount14, newnewprotons_mass_amount24,
                      newnewprotons_mass_amount34, newnewprotons_mass_amount44,
                      newnewprotons_mass_amount54, newnewprotons_mass_amount64,
                      newnewprotons_mass_amount74, newnewprotons_mass_amount84,
                      newnewprotons_mass_amount94,

                      newnewprotons_volume_amount12, newnewprotons_volume_amount22,
                      newnewprotons_volume_amount32, newnewprotons_volume_amount42,
                      newnewprotons_volume_amount52, newnewprotons_volume_amount62,
                      newnewprotons_volume_amount72, newnewprotons_volume_amount82,
                      newnewprotons_volume_amount92,

                      newnewprotons_volume_amount13, newnewprotons_volume_amount23,
                      newnewprotons_volume_amount33, newnewprotons_volume_amount43,
                      newnewprotons_volume_amount53, newnewprotons_volume_amount63,
                      newnewprotons_volume_amount73, newnewprotons_volume_amount83,
                      newnewprotons_volume_amount93,

                      newnewprotons_volume_amount14, newnewprotons_volume_amount24,
                      newnewprotons_volume_amount34, newnewprotons_volume_amount44,
                      newnewprotons_volume_amount54, newnewprotons_volume_amount64,
                      newnewprotons_volume_amount74, newnewprotons_volume_amount84,
                      newnewprotons_volume_amount94):

            self.newnewprotons_charge_amount12 = newnewprotons_charge_amount12
            self.newnewprotons_charge_amount22 = newnewprotons_charge_amount22
            self.newnewprotons_charge_amount32 = newnewprotons_charge_amount32
            self.newnewprotons_charge_amount42 = newnewprotons_charge_amount42
            self.newnewprotons_charge_amount52 = newnewprotons_charge_amount52
            self.newnewprotons_charge_amount62 = newnewprotons_charge_amount62
            self.newnewprotons_charge_amount72 = newnewprotons_charge_amount72
            self.newnewprotons_charge_amount82 = newnewprotons_charge_amount82
            self.newnewprotons_charge_amount92 = newnewprotons_charge_amount92

            self.newnewprotons_charge_amount13 = newnewprotons_charge_amount13
            self.newnewprotons_charge_amount23 = newnewprotons_charge_amount23
            self.newnewprotons_charge_amount33 = newnewprotons_charge_amount33
            self.newnewprotons_charge_amount43 = newnewprotons_charge_amount43
            self.newnewprotons_charge_amount53 = newnewprotons_charge_amount53
            self.newnewprotons_charge_amount63 = newnewprotons_charge_amount63
            self.newnewprotons_charge_amount73 = newnewprotons_charge_amount73
            self.newnewprotons_charge_amount83 = newnewprotons_charge_amount83
            self.newnewprotons_charge_amount93 = newnewprotons_charge_amount93

            self.newnewprotons_charge_amount14 = newnewprotons_charge_amount14
            self.newnewprotons_charge_amount24 = newnewprotons_charge_amount24
            self.newnewprotons_charge_amount34 = newnewprotons_charge_amount34
            self.newnewprotons_charge_amount44 = newnewprotons_charge_amount44
            self.newnewprotons_charge_amount54 = newnewprotons_charge_amount54
            self.newnewprotons_charge_amount64 = newnewprotons_charge_amount64
            self.newnewprotons_charge_amount74 = newnewprotons_charge_amount74
            self.newnewprotons_charge_amount84 = newnewprotons_charge_amount84
            self.newnewprotons_charge_amount94 = newnewprotons_charge_amount94

            self.newnewprotons_mass_amount12 = newnewprotons_mass_amount12
            self.newnewprotons_mass_amount22 = newnewprotons_mass_amount22
            self.newnewprotons_mass_amount32 = newnewprotons_mass_amount32
            self.newnewprotons_mass_amount42 = newnewprotons_mass_amount42
            self.newnewprotons_mass_amount52 = newnewprotons_mass_amount52
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            self.newnewprotons_mass_amount72 = newnewprotons_mass_amount72
            self.newnewprotons_mass_amount82 = newnewprotons_mass_amount82
            self.newnewprotons_mass_amount92 = newnewprotons_mass_amount92

            self.newnewprotons_mass_amount13 = newnewprotons_mass_amount13
            self.newnewprotons_mass_amount23 = newnewprotons_mass_amount23
            self.newnewprotons_mass_amount33 = newnewprotons_mass_amount33
            self.newnewprotons_mass_amount43 = newnewprotons_mass_amount43
            self.newnewprotons_mass_amount53 = newnewprotons_mass_amount53
            self.newnewprotons_mass_amount63 = newnewprotons_mass_amount63
            self.newnewprotons_mass_amount73 = newnewprotons_mass_amount73
            self.newnewprotons_mass_amount83 = newnewprotons_mass_amount83
            self.newnewprotons_mass_amount93 = newnewprotons_mass_amount93
```

```
            self.newnewprotons_mass_amount14 = newnewprotons_mass_amount14
            self.newnewprotons_mass_amount24 = newnewprotons_mass_amount24
            self.newnewprotons_mass_amount34 = newnewprotons_mass_amount34
            self.newnewprotons_mass_amount44 = newnewprotons_mass_amount44
            self.newnewprotons_mass_amount54 = newnewprotons_mass_amount54
            self.newnewprotons_mass_amount64 = newnewprotons_mass_amount64
            self.newnewprotons_mass_amount74 = newnewprotons_mass_amount74
            self.newnewprotons_mass_amount84 = newnewprotons_mass_amount84
            self.newnewprotons_mass_amount94 = newnewprotons_mass_amount94

            self.newnewprotons_volume_amount12 = newnewprotons_volume_amount12
            self.newnewprotons_volume_amount22 = newnewprotons_volume_amount22
            self.newnewprotons_volume_amount32 = newnewprotons_volume_amount32
            self.newnewprotons_volume_amount42 = newnewprotons_volume_amount42
            self.newnewprotons_volume_amount52 = newnewprotons_volume_amount52
            self.newnewprotons_volume_amount62 = newnewprotons_volume_amount62
            self.newnewprotons_volume_amount72 = newnewprotons_volume_amount72
            self.newnewprotons_volume_amount82 = newnewprotons_volume_amount82
            self.newnewprotons_volume_amount92 = newnewprotons_volume_amount92

            self.newnewprotons_volume_amount13 = newnewprotons_volume_amount13
            self.newnewprotons_volume_amount23 = newnewprotons_volume_amount23
            self.newnewprotons_volume_amount33 = newnewprotons_volume_amount33
            self.newnewprotons_volume_amount43 = newnewprotons_volume_amount43
            self.newnewprotons_volume_amount53 = newnewprotons_volume_amount53
            self.newnewprotons_volume_amount63 = newnewprotons_volume_amount63
            self.newnewprotons_volume_amount73 = newnewprotons_volume_amount73
            self.newnewprotons_volume_amount83 = newnewprotons_volume_amount83
            self.newnewprotons_volume_amount93 = newnewprotons_volume_amount93

            self.newnewprotons_volume_amount14 = newnewprotons_volume_amount14
            self.newnewprotons_volume_amount24 = newnewprotons_volume_amount24
            self.newnewprotons_volume_amount34 = newnewprotons_volume_amount34
            self.newnewprotons_volume_amount44 = newnewprotons_volume_amount44
            self.newnewprotons_volume_amount54 = newnewprotons_volume_amount54
            self.newnewprotons_volume_amount64 = newnewprotons_volume_amount64
            self.newnewprotons_volume_amount74 = newnewprotons_volume_amount74
            self.newnewprotons_volume_amount84 = newnewprotons_volume_amount84
            self.newnewprotons_volume_amount94 = newnewprotons_volume_amount94


# Second phase

# Change in electrical charges across shells
newnewprotons_charge_amount12 = newnewprotons[0].charge
newnewprotons_charge_amount22 = newnewprotons[1].charge
newnewprotons_charge_amount32 = newnewprotons[2].charge
newnewprotons_charge_amount42 = newnewprotons[3].charge
newnewprotons_charge_amount52 = newnewprotons[4].charge + newnewprotons[5].charge/2
newnewprotons_charge_amount62 = 0
newnewprotons_charge_amount72 = newnewprotons[6].charge + newnewprotons[5].charge/2
newnewprotons_charge_amount82 = newnewprotons[7].charge
newnewprotons_charge_amount92 = newnewprotons[8].charge

# Mass change over shells
newnewprotons_mass_amount12 = newnewprotons[0].mass
newnewprotons_mass_amount22 = newnewprotons[1].mass
newnewprotons_mass_amount32 = newnewprotons[2].mass
newnewprotons_mass_amount42 = newnewprotons[3].mass
newnewprotons_mass_amount52 = newnewprotons[4].mass +\
melectron_mass_amount/melectron_charge_amount *\
(abs(newnewprotons[5].charge/2 + newnewprotons[4].charge) - newnewprotons[4].charge)

newnewprotons_mass_amount62 = newnewprotons[5].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(newnewprotons[5].charge)

newnewprotons_mass_amount72 = newnewprotons[6].mass +\
melectron_mass_amount/melectron_charge_amount * \
(abs(newnewprotons[5].charge/2 + newnewprotons[6].charge) - newnewprotons[6].charge)

newnewprotons_mass_amount82 = newnewprotons[7].mass
newnewprotons_mass_amount92 = newnewprotons[8].mass

# Volume change over shells
newnewprotons_volume_amount12 = newnewprotons[0].volume
newnewprotons_volume_amount22 = newnewprotons[1].volume
newnewprotons_volume_amount32 = newnewprotons[2].volume
newnewprotons_volume_amount42 = newnewprotons[3].volume
newnewprotons_volume_amount52 = newnewprotons[4].volume +\
melectron_volume_amount/melectron_charge_amount *\
(abs(newnewprotons[5].charge/2 + newnewprotons[4].charge) - newnewprotons[4].charge)

newnewprotons_volume_amount62 = newnewprotons[5].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(newnewprotons[5].charge)

newnewprotons_volume_amount72 = newnewprotons[6].volume +\
melectron_volume_amount/melectron_charge_amount * \
(abs(newnewprotons[5].charge/2 + newnewprotons[6].charge) - newnewprotons[6].charge)

newnewprotons_volume_amount82 = newnewprotons[7].volume
newnewprotons_volume_amount92 = newnewprotons[8].volume


# Third phase

# Change in electrical charges across shells
newnewprotons_charge_amount13 = newnewprotons[0].charge
newnewprotons_charge_amount23 = newnewprotons[1].charge
newnewprotons_charge_amount33 = newnewprotons[2].charge

newnewprotons_charge_amount43 = newnewprotons[3].charge + newnewprotons_charge_amount52

newnewprotons_charge_amount53 = 0
newnewprotons_charge_amount63 = 0
newnewprotons_charge_amount73 = 0

newnewprotons_charge_amount83 = newnewprotons[7].charge + newnewprotons_charge_amount72
newnewprotons_charge_amount93 = newnewprotons[8].charge

# Mass change over shells
newnewprotons_mass_amount13 = newnewprotons[0].mass
newnewprotons_mass_amount23 = newnewprotons[1].mass
newnewprotons_mass_amount33 = newnewprotons[2].mass

newnewprotons_mass_amount43 = newnewprotons[3].mass + \
melectron_mass_amount/melectron_charge_amount * \
(abs(newnewprotons_charge_amount52 + newnewprotons[3].charge) - newnewprotons[3].charge)

newnewprotons_mass_amount53 = newnewprotons[6].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewprotons[6].charge

newnewprotons_mass_amount63 = newnewprotons_mass_amount62
newnewprotons_mass_amount73 = newnewprotons[6].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewprotons[6].charge
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newnewprotons_mass_amount83 = newnewprotons[7].mass -\
melectron_mass_amount/melectron_charge_amount *\
abs(newnewprotons[7].charge +newnewprotons_charge_amount72)

newnewprotons_mass_amount93 = newnewprotons[8].charge

# Volume change over shells
newnewprotons_volume_amount13 = newnewprotons[0].volume
newnewprotons_volume_amount23 = newnewprotons[1].volume
newnewprotons_volume_amount33 = newnewprotons[2].volume

newnewprotons_volume_amount43 = newnewprotons[3].volume + \
melectron_volume_amount/melectron_charge_amount * \
(abs(newnewprotons_charge_amount52 + newnewprotons[3].charge) - newnewprotons[3].charge)

newnewprotons_volume_amount53 = newnewprotons[6].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewprotons[6].charge

newnewprotons_volume_amount63 = newnewprotons_volume_amount62
newnewprotons_volume_amount73 = newnewprotons[6].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewprotons[6].charge

newnewprotons_volume_amount83 = newnewprotons[7].volume -\
melectron_volume_amount/melectron_charge_amount *\
abs(newnewprotons[7].charge +newnewprotons_charge_amount72)

newnewprotons_volume_amount93 = newnewprotons[8].volume

# Fourth phase

# Change in electrical charges across shells
newnewprotons_charge_amount14 = newnewprotons[0].charge
newnewprotons_charge_amount24 = newnewprotons[1].charge
newnewprotons_charge_amount34 = newnewprotons[2].charge + newnewprotons_charge_amount43

newnewprotons_charge_amount44 = 0
newnewprotons_charge_amount54 = 0
newnewprotons_charge_amount64 = 0
newnewprotons_charge_amount74 = 0
newnewprotons_charge_amount84 = newnewprotons_charge_amount83
newnewprotons_charge_amount94 = newnewprotons[8].charge

# Mass change over shells
newnewprotons_mass_amount14 = newnewprotons[0].mass
newnewprotons_mass_amount24 = newnewprotons[1].mass
newnewprotons_mass_amount34 = newnewprotons[2].mass +\
melectron_mass_amount/melectron_charge_amount *\
(newnewprotons[2].charge + newnewprotons_charge_amount43)

newnewprotons_mass_amount44 = newnewprotons[3].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewprotons[3].charge

newnewprotons_mass_amount54 = newnewprotons[4].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewprotons[4].charge

newnewprotons_mass_amount64 = newnewprotons[5].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewprotons[5].charge

newnewprotons_mass_amount74 = newnewprotons[6].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewprotons[6].charge

newnewprotons_mass_amount84 = newnewprotons_mass_amount83
newnewprotons_mass_amount94 = newnewprotons[8].mass

# Volume change over shells
newnewprotons_volume_amount14 = newnewprotons[0].volume
newnewprotons_volume_amount24 = newnewprotons[1].volume
newnewprotons_volume_amount34 = newnewprotons[2].volume +\
melectron_volume_amount/melectron_charge_amount *\
(newnewprotons[2].charge + newnewprotons_charge_amount43)

newnewprotons_volume_amount44 = newnewprotons[3].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewprotons[3].charge

newnewprotons_volume_amount54 = newnewprotons[4].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewprotons[4].charge

newnewprotons_volume_amount64 = newnewprotons[5].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewprotons[5].charge

newnewprotons_volume_amount74 = newnewprotons[6].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewprotons[6].charge

newnewprotons_volume_amount84 = newnewprotons_volume_amount83
newnewprotons_volume_amount94 = newnewprotons[8].volume

unit19 = NewnewprotonCycles(newnewprotons_charge_amount12, newnewprotons_charge_amount22,
                      newnewprotons_charge_amount32, newnewprotons_charge_amount42,
                      newnewprotons_charge_amount52, newnewprotons_charge_amount62,
                      newnewprotons_charge_amount72, newnewprotons_charge_amount82,
                      newnewprotons_charge_amount92,

                      newnewprotons_charge_amount13, newnewprotons_charge_amount23,
                      newnewprotons_charge_amount33, newnewprotons_charge_amount43,
                      newnewprotons_charge_amount53, newnewprotons_charge_amount63,
                      newnewprotons_charge_amount73, newnewprotons_charge_amount83,
                      newnewprotons_charge_amount93,

                      newnewprotons_charge_amount14, newnewprotons_charge_amount24,
                      newnewprotons_charge_amount34, newnewprotons_charge_amount44,
                      newnewprotons_charge_amount54, newnewprotons_charge_amount64,
                      newnewprotons_charge_amount74, newnewprotons_charge_amount84,
                      newnewprotons_charge_amount94,

                      newnewprotons_mass_amount12, newnewprotons_mass_amount22,
                      newnewprotons_mass_amount32, newnewprotons_mass_amount42,
                      newnewprotons_mass_amount52, newnewprotons_mass_amount62,
                      newnewprotons_mass_amount72, newnewprotons_mass_amount82,
                      newnewprotons_mass_amount92,

                      newnewprotons_mass_amount13, newnewprotons_mass_amount23,
                      newnewprotons_mass_amount33, newnewprotons_mass_amount43,
                      newnewprotons_mass_amount53, newnewprotons_mass_amount63,
                      newnewprotons_mass_amount73, newnewprotons_mass_amount83,
                      newnewprotons_mass_amount93,

                      newnewprotons_mass_amount14, newnewprotons_mass_amount24,
                      newnewprotons_mass_amount34, newnewprotons_mass_amount44,
                      newnewprotons_mass_amount54, newnewprotons_mass_amount64,
                      newnewprotons_mass_amount74, newnewprotons_mass_amount84,
                      newnewprotons_mass_amount94,

                      newnewprotons_volume_amount14, newnewprotons_volume_amount24,
                      newnewprotons_volume_amount34, newnewprotons_volume_amount44,
                      newnewprotons_volume_amount54, newnewprotons_volume_amount64,
                      newnewprotons_volume_amount74, newnewprotons_volume_amount84,
                      newnewprotons_volume_amount94,

                      newnewprotons_volume_amount13, newnewprotons_volume_amount23,
                      newnewprotons_volume_amount33, newnewprotons_volume_amount43,
                      newnewprotons_volume_amount53, newnewprotons_volume_amount63,
                      newnewprotons_volume_amount73, newnewprotons_volume_amount83,
                      newnewprotons_volume_amount93,

                      newnewprotons_volume_amount14, newnewprotons_volume_amount24,
                      newnewprotons_volume_amount34, newnewprotons_volume_amount44,
                      newnewprotons_volume_amount54, newnewprotons_volume_amount64,
                      newnewprotons_volume_amount74, newnewprotons_volume_amount84,
                      newnewprotons_volume_amount94)

if around((newnewprotons[0].charge +  newnewprotons[1].charge +\
           newnewprotons[2].charge + newnewprotons[3].charge \
                   + newnewprotons[4].charge), 1) != around((newnewprotons[6].charge\
                                                             + newnewprotons[7].charge + \
                                                       newnewprotons[8].charge), 1):
            print('Make changes to class NewnewprotonCycles')

# The movement of charged particles is taken into account, only
class NewneutronCycles():
    def __init__ (self, newnewneutrons_charge_amount12, newnewneutrons_charge_amount22,
                      newnewneutrons_charge_amount32, newnewneutrons_charge_amount42,
                      newnewneutrons_charge_amount52, newnewneutrons_charge_amount62,
                      newnewneutrons_charge_amount72, newnewneutrons_charge_amount82,
                      newnewneutrons_charge_amount92,

                      newnewneutrons_charge_amount13, newnewneutrons_charge_amount23,
                      newnewneutrons_charge_amount33, newnewneutrons_charge_amount43,
                      newnewneutrons_charge_amount53, newnewneutrons_charge_amount63,
                      newnewneutrons_charge_amount73, newnewneutrons_charge_amount83,
                      newnewneutrons_charge_amount93,

                      newnewneutrons_charge_amount14, newnewneutrons_charge_amount24,
                      newnewneutrons_charge_amount34, newnewneutrons_charge_amount44,
                      newnewneutrons_charge_amount54, newnewneutrons_charge_amount64,
                      newnewneutrons_charge_amount74, newnewneutrons_charge_amount84,
                      newnewneutrons_charge_amount94,

                      newnewneutrons_charge_amount15, newnewneutrons_charge_amount25,
                      newnewneutrons_charge_amount35, newnewneutrons_charge_amount45,
                      newnewneutrons_charge_amount55, newnewneutrons_charge_amount65,
                      newnewneutrons_charge_amount75, newnewneutrons_charge_amount85,
                      newnewneutrons_charge_amount95,

                      newnewneutrons_mass_amount12, newnewneutrons_mass_amount22,
                      newnewneutrons_mass_amount32, newnewneutrons_mass_amount42,
                      newnewneutrons_mass_amount52, newnewneutrons_mass_amount62,
                      newnewneutrons_mass_amount72, newnewneutrons_mass_amount82,
                      newnewneutrons_mass_amount92,

                      newnewneutrons_mass_amount13, newnewneutrons_mass_amount23,
                      newnewneutrons_mass_amount33, newnewneutrons_mass_amount43,
                      newnewneutrons_mass_amount53, newnewneutrons_mass_amount63,
                      newnewneutrons_mass_amount73, newnewneutrons_mass_amount83,
                      newnewneutrons_mass_amount93,
                      newnewneutrons_mass_amount14, newnewneutrons_mass_amount24,
                      newnewneutrons_mass_amount34, newnewneutrons_mass_amount44,
                      newnewneutrons_mass_amount54, newnewneutrons_mass_amount64,
                      newnewneutrons_mass_amount74, newnewneutrons_mass_amount84,
                      newnewneutrons_mass_amount94,

                      newnewneutrons_mass_amount15, newnewneutrons_mass_amount25,
                      newnewneutrons_mass_amount35, newnewneutrons_mass_amount45,
                      newnewneutrons_mass_amount55, newnewneutrons_mass_amount65,
                      newnewneutrons_mass_amount75, newnewneutrons_mass_amount85,
                      newnewneutrons_mass_amount95,

                      newnewneutrons_volume_amount12, newnewneutrons_volume_amount22,
                      newnewneutrons_volume_amount32, newnewneutrons_volume_amount42,
                      newnewneutrons_volume_amount52, newnewneutrons_volume_amount62,
                      newnewneutrons_volume_amount72, newnewneutrons_volume_amount82,
                      newnewneutrons_volume_amount92,

                      newnewneutrons_volume_amount13, newnewneutrons_volume_amount23,
                      newnewneutrons_volume_amount33, newnewneutrons_volume_amount43,
                      newnewneutrons_volume_amount53, newnewneutrons_volume_amount63,
                      newnewneutrons_volume_amount73, newnewneutrons_volume_amount83,
                      newnewneutrons_volume_amount93,

                      newnewneutrons_volume_amount14, newnewneutrons_volume_amount24,
                      newnewneutrons_volume_amount34, newnewneutrons_volume_amount44,
                      newnewneutrons_volume_amount54, newnewneutrons_volume_amount64,
                      newnewneutrons_volume_amount74, newnewneutrons_volume_amount84,
                      newnewneutrons_volume_amount94,

                      newnewneutrons_volume_amount15, newnewneutrons_volume_amount25,
                      newnewneutrons_volume_amount35, newnewneutrons_volume_amount45,
                      newnewneutrons_volume_amount55, newnewneutrons_volume_amount65,
                      newnewneutrons_volume_amount75, newnewneutrons_volume_amount85,
                      newnewneutrons_volume_amount95):

            self.newnewneutrons_charge_amount12 = newnewneutrons_charge_amount12
            self.newnewneutrons_charge_amount22 = newnewneutrons_charge_amount22
            self.newnewneutrons_charge_amount32 = newnewneutrons_charge_amount32
            self.newnewneutrons_charge_amount42 = newnewneutrons_charge_amount42
            self.newnewneutrons_charge_amount52 = newnewneutrons_charge_amount52
            self.newnewneutrons_charge_amount62 = newnewneutrons_charge_amount62
            self.newnewneutrons_charge_amount72 = newnewneutrons_charge_amount72
            self.newnewneutrons_charge_amount82 = newnewneutrons_charge_amount82
            self.newnewneutrons_charge_amount92 = newnewneutrons_charge_amount92

            self.newnewneutrons_charge_amount13 = newnewneutrons_charge_amount13
            self.newnewneutrons_charge_amount23 = newnewneutrons_charge_amount23
            self.newnewneutrons_charge_amount33 = newnewneutrons_charge_amount33
            self.newnewneutrons_charge_amount43 = newnewneutrons_charge_amount43
            self.newnewneutrons_charge_amount53 = newnewneutrons_charge_amount53
            self.newnewneutrons_charge_amount63 = newnewneutrons_charge_amount63
            self.newnewneutrons_charge_amount73 = newnewneutrons_charge_amount73
            self.newnewneutrons_charge_amount83 = newnewneutrons_charge_amount83
            self.newnewneutrons_charge_amount93 = newnewneutrons_charge_amount93

            self.newnewneutrons_charge_amount14 = newnewneutrons_charge_amount14
            self.newnewneutrons_charge_amount24 = newnewneutrons_charge_amount24
            self.newnewneutrons_charge_amount34 = newnewneutrons_charge_amount34
            self.newnewneutrons_charge_amount44 = newnewneutrons_charge_amount44
            self.newnewneutrons_charge_amount54 = newnewneutrons_charge_amount54
            self.newnewneutrons_charge_amount64 = newnewneutrons_charge_amount64
            self.newnewneutrons_charge_amount74 = newnewneutrons_charge_amount74
            self.newnewneutrons_charge_amount84 = newnewneutrons_charge_amount84
            self.newnewneutrons_charge_amount94 = newnewneutrons_charge_amount94
            self.newnewneutrons_charge_amount15 = newnewneutrons_charge_amount15
            self.newnewneutrons_charge_amount25 = newnewneutrons_charge_amount25
            self.newnewneutrons_charge_amount35 = newnewneutrons_charge_amount35
            self.newnewneutrons_charge_amount45 = newnewneutrons_charge_amount45
            self.newnewneutrons_charge_amount55 = newnewneutrons_charge_amount55
            self.newnewneutrons_charge_amount65 = newnewneutrons_charge_amount65
            self.newnewneutrons_charge_amount75 = newnewneutrons_charge_amount75
            self.newnewneutrons_charge_amount85 = newnewneutrons_charge_amount85
            self.newnewneutrons_charge_amount95 = newnewneutrons_charge_amount95

            self.newnewneutrons_mass_amount12 = newnewneutrons_mass_amount12
            self.newnewneutrons_mass_amount22 = newnewneutrons_mass_amount22
            self.newnewneutrons_mass_amount32 = newnewneutrons_mass_amount32
            self.newnewneutrons_mass_amount42 = newnewneutrons_mass_amount42
            self.newnewneutrons_mass_amount52 = newnewneutrons_mass_amount52
            self.newnewneutrons_mass_amount62 = newnewneutrons_mass_amount62
            self.newnewneutrons_mass_amount72 = newnewneutrons_mass_amount72
            self.newnewneutrons_mass_amount82 = newnewneutrons_mass_amount82
            self.newnewneutrons_mass_amount92 = newnewneutrons_mass_amount92

            self.newnewneutrons_mass_amount13 = newnewneutrons_mass_amount13
            self.newnewneutrons_mass_amount23 = newnewneutrons_mass_amount23
            self.newnewneutrons_mass_amount33 = newnewneutrons_mass_amount33
            self.newnewneutrons_mass_amount43 = newnewneutrons_mass_amount43
            self.newnewneutrons_mass_amount53 = newnewneutrons_mass_amount53
            self.newnewneutrons_mass_amount63 = newnewneutrons_mass_amount63
            self.newnewneutrons_mass_amount73 = newnewneutrons_mass_amount73
            self.newnewneutrons_mass_amount83 = newnewneutrons_mass_amount83
            self.newnewneutrons_mass_amount93 = newnewneutrons_mass_amount93

            self.newnewneutrons_mass_amount14 = newnewneutrons_mass_amount14
            self.newnewneutrons_mass_amount24 = newnewneutrons_mass_amount24
            self.newnewneutrons_mass_amount34 = newnewneutrons_mass_amount34
            self.newnewneutrons_mass_amount44 = newnewneutrons_mass_amount44
            self.newnewneutrons_mass_amount54 = newnewneutrons_mass_amount54
            self.newnewneutrons_mass_amount64 = newnewneutrons_mass_amount64
            self.newnewneutrons_mass_amount74 = newnewneutrons_mass_amount74
            self.newnewneutrons_mass_amount84 = newnewneutrons_mass_amount84
            self.newnewneutrons_mass_amount94 = newnewneutrons_mass_amount94

            self.newnewneutrons_mass_amount15 = newnewneutrons_mass_amount15
            self.newnewneutrons_mass_amount25 = newnewneutrons_mass_amount25
            self.newnewneutrons_mass_amount35 = newnewneutrons_mass_amount35
            self.newnewneutrons_mass_amount45 = newnewneutrons_mass_amount45
            self.newnewneutrons_mass_amount55 = newnewneutrons_mass_amount55
            self.newnewneutrons_mass_amount65 = newnewneutrons_mass_amount65
            self.newnewneutrons_mass_amount75 = newnewneutrons_mass_amount75
            self.newnewneutrons_mass_amount85 = newnewneutrons_mass_amount85
            self.newnewneutrons_mass_amount95 = newnewneutrons_mass_amount95

            self.newnewneutrons_volume_amount12 = newnewneutrons_volume_amount12
            self.newnewneutrons_volume_amount22 = newnewneutrons_volume_amount22
            self.newnewneutrons_volume_amount32 = newnewneutrons_volume_amount32
            self.newnewneutrons_volume_amount42 = newnewneutrons_volume_amount42
            self.newnewneutrons_volume_amount52 = newnewneutrons_volume_amount52
            self.newnewneutrons_volume_amount62 = newnewneutrons_volume_amount62
            self.newnewneutrons_volume_amount72 = newnewneutrons_volume_amount72
            self.newnewneutrons_volume_amount82 = newnewneutrons_volume_amount82
            self.newnewneutrons_volume_amount92 = newnewneutrons_volume_amount92

            self.newnewneutrons_volume_amount13 = newnewneutrons_volume_amount13
            self.newnewneutrons_volume_amount23 = newnewneutrons_volume_amount23
            self.newnewneutrons_volume_amount33 = newnewneutrons_volume_amount33
            self.newnewneutrons_volume_amount43 = newnewneutrons_volume_amount43
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            self.newnewneutrons_volume_amount53 = newnewneutrons_volume_amount53
            self.newnewneutrons_volume_amount63 = newnewneutrons_volume_amount63
            self.newnewneutrons_volume_amount73 = newnewneutrons_volume_amount73
            self.newnewneutrons_volume_amount83 = newnewneutrons_volume_amount83
            self.newnewneutrons_volume_amount93 = newnewneutrons_volume_amount93

            self.newnewneutrons_volume_amount14 = newnewneutrons_volume_amount14
            self.newnewneutrons_volume_amount24 = newnewneutrons_volume_amount24
            self.newnewneutrons_volume_amount34 = newnewneutrons_volume_amount34
            self.newnewneutrons_volume_amount44 = newnewneutrons_volume_amount44
            self.newnewneutrons_volume_amount54 = newnewneutrons_volume_amount54
            self.newnewneutrons_volume_amount64 = newnewneutrons_volume_amount64
            self.newnewneutrons_volume_amount74 = newnewneutrons_volume_amount74
            self.newnewneutrons_volume_amount84 = newnewneutrons_volume_amount84
            self.newnewneutrons_volume_amount94 = newnewneutrons_volume_amount94

            self.newnewneutrons_volume_amount15 = newnewneutrons_volume_amount15
            self.newnewneutrons_volume_amount25 = newnewneutrons_volume_amount25
            self.newnewneutrons_volume_amount35 = newnewneutrons_volume_amount35
            self.newnewneutrons_volume_amount45 = newnewneutrons_volume_amount45
            self.newnewneutrons_volume_amount55 = newnewneutrons_volume_amount55
            self.newnewneutrons_volume_amount65 = newnewneutrons_volume_amount65
            self.newnewneutrons_volume_amount75 = newnewneutrons_volume_amount75
            self.newnewneutrons_volume_amount85 = newnewneutrons_volume_amount85
            self.newnewneutrons_volume_amount95 = newnewneutrons_volume_amount95


# Second phase

# Change in electrical charges across shells
newnewneutrons_charge_amount12 = 0
newnewneutrons_charge_amount22 = 0
newnewneutrons_charge_amount32 = newnewneutrons[2].charge + \
(newnewneutrons[1].charge + newnewneutrons[0].charge)

newnewneutrons_charge_amount42 = newnewneutrons[3].charge
newnewneutrons_charge_amount52 = newnewneutrons[4].charge
newnewneutrons_charge_amount62 = newnewneutrons[5].charge
newnewneutrons_charge_amount72 = newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge

newnewneutrons_charge_amount82 = 0
newnewneutrons_charge_amount92 = 0

# Mass change over shells
newnewneutrons_mass_amount12 = newnewneutrons[0].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewneutrons[0].charge

newnewneutrons_mass_amount22 = newnewneutrons[1].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(newnewneutrons[1].charge)

newnewneutrons_mass_amount32 = newnewneutrons[2].mass +\
melectron_mass_amount/melectron_charge_amount * \
abs(newnewneutrons[1].charge + newnewneutrons[0].charge)

newnewneutrons_mass_amount42 = newnewneutrons[3].mass
newnewneutrons_mass_amount52 = newnewneutrons[4].mass
newnewneutrons_mass_amount62 = newnewneutrons[5].mass
newnewneutrons_mass_amount72 = newnewneutrons[6].mass + \
melectron_mass_amount/melectron_charge_amount * \
abs(newnewneutrons[7].charge + newnewneutrons[8].charge)

newnewneutrons_mass_amount82 = newnewneutrons[7].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(newnewneutrons[7].charge)

newnewneutrons_mass_amount92 = newnewneutrons[8].mass -\
melectron_mass_amount/melectron_charge_amount * \
newnewneutrons[8].charge

# Volume change over shells
newnewneutrons_volume_amount12 = newnewneutrons[0].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewneutrons[0].charge

newnewneutrons_volume_amount22 = newnewneutrons[1].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(newnewneutrons[1].charge)

newnewneutrons_volume_amount32 = newnewneutrons[2].volume +\
melectron_volume_amount/melectron_charge_amount * \
abs(newnewneutrons[1].charge + newnewneutrons[0].charge)

newnewneutrons_volume_amount42 = newnewneutrons[3].volume
newnewneutrons_volume_amount52 = newnewneutrons[4].volume
newnewneutrons_volume_amount62 = newnewneutrons[5].volume

newnewneutrons_volume_amount72 = newnewneutrons[6].volume +\
melectron_volume_amount/melectron_charge_amount * \
abs(newnewneutrons[7].charge + newnewneutrons[8].charge)

newnewneutrons_volume_amount82 = newnewneutrons[7].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(newnewneutrons[7].charge)

newnewneutrons_volume_amount92 = newnewneutrons[8].volume -\
melectron_volume_amount/melectron_charge_amount * \
newnewneutrons[8].charge

# Third phase

# Change in electrical charges across shells
newnewneutrons_charge_amount13 = 0
newnewneutrons_charge_amount23 = 0
newnewneutrons_charge_amount33 = 0
newnewneutrons_charge_amount43 = newnewneutrons[3].charge + newnewneutrons[2].charge +\
(newnewneutrons[1].charge + newnewneutrons[0].charge)

newnewneutrons_charge_amount53 = newnewneutrons[4].charge
newnewneutrons_charge_amount63 = newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge

newnewneutrons_charge_amount73 = 0
newnewneutrons_charge_amount83 = 0
newnewneutrons_charge_amount93 = 0

# Mass change over shells
newnewneutrons_mass_amount13 = newnewneutrons_mass_amount12
newnewneutrons_mass_amount23 = newnewneutrons_mass_amount22

newnewneutrons_mass_amount33 = newnewneutrons[2].mass -\
melectron_mass_amount/melectron_charge_amount * newnewneutrons[2].charge

newnewneutrons_mass_amount43 = newnewneutrons[3].mass +\
melectron_mass_amount/melectron_charge_amount *\
abs(newnewneutrons[2].charge + newnewneutrons[1].charge + newnewneutrons[0].charge)

newnewneutrons_mass_amount53 = newnewneutrons[4].mass
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newnewneutrons_mass_amount63 = newnewneutrons[5].mass +\
melectron_mass_amount/melectron_charge_amount *\
abs(newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge)

newnewneutrons_mass_amount73 = newnewneutrons[6].mass -\
melectron_mass_amount/melectron_charge_amount * newnewneutrons[6].charge

newnewneutrons_mass_amount83 = newnewneutrons_mass_amount82
newnewneutrons_mass_amount93 = newnewneutrons_mass_amount92

# Volume change over shells
newnewneutrons_volume_amount13 = newnewneutrons_volume_amount12
newnewneutrons_volume_amount23 = newnewneutrons_volume_amount22

newnewneutrons_volume_amount33 = newnewneutrons[2].volume -\
melectron_volume_amount/melectron_charge_amount * newnewneutrons[2].charge

newnewneutrons_volume_amount43 = newnewneutrons[3].volume +\
melectron_volume_amount/melectron_charge_amount *\
abs(newnewneutrons[2].charge + (newnewneutrons[1].charge + newnewneutrons[0].charge))

newnewneutrons_volume_amount53 = newnewneutrons[4].volume

newnewneutrons_volume_amount63 = newnewneutrons[5].volume +\
melectron_volume_amount/melectron_charge_amount *\
abs(newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge)

newnewneutrons_volume_amount73 = newnewneutrons[6].volume -\
melectron_volume_amount/melectron_charge_amount * newnewneutrons[6].charge

newnewneutrons_volume_amount83 = newnewneutrons_volume_amount82
newnewneutrons_volume_amount93 = newnewneutrons_volume_amount92

# Fourth phase

# Change in electrical charges across shells
newnewneutrons_charge_amount14 = 0
newnewneutrons_charge_amount24 = 0
newnewneutrons_charge_amount34 = 0
newnewneutrons_charge_amount44 = 0

newnewneutrons_charge_amount54 = newnewneutrons[4].charge +\
newnewneutrons[3].charge + newnewneutrons[2].charge +\
(newnewneutrons[1].charge + newnewneutrons[0].charge)

newnewneutrons_charge_amount64 = newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge

newnewneutrons_charge_amount74 = 0
newnewneutrons_charge_amount84 = 0
newnewneutrons_charge_amount94 = 0

# Mass change over shells
newnewneutrons_mass_amount14 = newnewneutrons_mass_amount13
newnewneutrons_mass_amount24 = newnewneutrons_mass_amount23
newnewneutrons_mass_amount34 = newnewneutrons_mass_amount33

newnewneutrons_mass_amount44 = newnewneutrons[3].mass -\
melectron_mass_amount/melectron_charge_amount *\
newnewneutrons[3].charge

newnewneutrons_mass_amount54 = newnewneutrons[4].mass + \
abs(melectron_mass_amount/melectron_charge_amount *\
   newnewneutrons[3].charge + newnewneutrons[2].charge +\
(newnewneutrons[1].charge + newnewneutrons[0].charge))

newnewneutrons_mass_amount64 = newnewneutrons[5].mass +\
melectron_mass_amount/melectron_charge_amount * \
abs(newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge)

newnewneutrons_mass_amount74 = newnewneutrons_mass_amount73
newnewneutrons_mass_amount84 = newnewneutrons_mass_amount83
newnewneutrons_mass_amount94 = newnewneutrons_mass_amount93


# Volume change over shells
newnewneutrons_volume_amount14 = newnewneutrons_volume_amount13
newnewneutrons_volume_amount24 = newnewneutrons_volume_amount23
newnewneutrons_volume_amount34 = newnewneutrons_volume_amount33

newnewneutrons_volume_amount44 = newnewneutrons[3].volume -\
melectron_volume_amount/melectron_charge_amount *\
newnewneutrons[3].charge

newnewneutrons_volume_amount54 = newnewneutrons[4].volume + \
abs(melectron_volume_amount/melectron_charge_amount *\
   newnewneutrons[3].charge + newnewneutrons[2].charge +\
(newnewneutrons[1].charge + newnewneutrons[0].charge))

newnewneutrons_volume_amount64 = newnewneutrons[5].volume +\
melectron_volume_amount/melectron_charge_amount * \
abs(newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge)

newnewneutrons_volume_amount74 = newnewneutrons_volume_amount73
newnewneutrons_volume_amount84 = newnewneutrons_volume_amount83
newnewneutrons_volume_amount94 = newnewneutrons_volume_amount93

# Fifth phase

# Change in electrical charges across shells
newnewneutrons_charge_amount15 = 0
newnewneutrons_charge_amount25 = 0
newnewneutrons_charge_amount35 = 0
newnewneutrons_charge_amount45 = 0
newnewneutrons_charge_amount55 = 0

newnewneutrons_charge_amount65 = newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge + newnewneutrons[4].charge +\
newnewneutrons[3].charge + newnewneutrons[2].charge + (newnewneutrons[1].charge +\
                                           newnewneutrons[0].charge)
newnewneutrons_charge_amount75 = 0
newnewneutrons_charge_amount85 = 0
newnewneutrons_charge_amount95 = 0

# Mass change over shells
newnewneutrons_mass_amount15 = newnewneutrons_mass_amount14
newnewneutrons_mass_amount25 = newnewneutrons_mass_amount24
newnewneutrons_mass_amount35 = newnewneutrons_mass_amount34
newnewneutrons_mass_amount45 = newnewneutrons_mass_amount44
newnewneutrons_mass_amount55 = newnewneutrons[4].mass -\
melectron_mass_amount/melectron_charge_amount * newnewneutrons[4].charge

newnewneutrons_mass_amount65 = newnewneutrons[5].mass +\
melectron_mass_amount/melectron_charge_amount * \
abs(newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge + newnewneutrons[4].charge +\
newnewneutrons[3].charge + newnewneutrons[2].charge + (newnewneutrons[1].charge +\
                                           newnewneutrons[0].charge))
newnewneutrons_mass_amount75 = newnewneutrons_mass_amount74
newnewneutrons_mass_amount85 = newnewneutrons_mass_amount84
newnewneutrons_mass_amount95 = newnewneutrons_mass_amount94

# Volume change over shells
newnewneutrons_volume_amount15 = newnewneutrons_volume_amount14
newnewneutrons_volume_amount25 = newnewneutrons_volume_amount24
newnewneutrons_volume_amount35 = newnewneutrons_volume_amount34
newnewneutrons_volume_amount45 = newnewneutrons_volume_amount44
newnewneutrons_volume_amount55 = newnewneutrons[4].volume -\
melectron_volume_amount/melectron_charge_amount * newnewneutrons[4].charge

newnewneutrons_volume_amount65 = newnewneutrons[5].volume + +\
melectron_volume_amount/melectron_charge_amount * \
abs(newnewneutrons[5].charge + newnewneutrons[6].charge +\
newnewneutrons[7].charge + newnewneutrons[8].charge + newnewneutrons[4].charge +\
newnewneutrons[3].charge + newnewneutrons[2].charge + (newnewneutrons[1].charge +\
                                           newnewneutrons[0].charge))

newnewneutrons_volume_amount75 = newnewneutrons_volume_amount74
newnewneutrons_volume_amount85 = newnewneutrons_volume_amount84
newnewneutrons_volume_amount95 = newnewneutrons_volume_amount94


unit20 = NewneutronCycles(newnewneutrons_charge_amount12, newnewneutrons_charge_amount22,
                      newnewneutrons_charge_amount32, newnewneutrons_charge_amount42,
                      newnewneutrons_charge_amount52, newnewneutrons_charge_amount62,
                      newnewneutrons_charge_amount72, newnewneutrons_charge_amount82,
                      newnewneutrons_charge_amount92,

                      newnewneutrons_charge_amount13, newnewneutrons_charge_amount23,
                      newnewneutrons_charge_amount33, newnewneutrons_charge_amount43,
                      newnewneutrons_charge_amount53, newnewneutrons_charge_amount63,
                      newnewneutrons_charge_amount73, newnewneutrons_charge_amount83,
                      newnewneutrons_charge_amount93,

                      newnewneutrons_charge_amount14, newnewneutrons_charge_amount24,
                      newnewneutrons_charge_amount34, newnewneutrons_charge_amount44,
                      newnewneutrons_charge_amount54, newnewneutrons_charge_amount64,
                      newnewneutrons_charge_amount74, newnewneutrons_charge_amount84,
                      newnewneutrons_charge_amount94,

                      newnewneutrons_charge_amount15, newnewneutrons_charge_amount25,
                      newnewneutrons_charge_amount35, newnewneutrons_charge_amount45,
                      newnewneutrons_charge_amount55, newnewneutrons_charge_amount65,
                      newnewneutrons_charge_amount75, newnewneutrons_charge_amount85,
                      newnewneutrons_charge_amount95,

                      newnewneutrons_mass_amount12, newnewneutrons_mass_amount22,
                      newnewneutrons_mass_amount32, newnewneutrons_mass_amount42,
                      newnewneutrons_mass_amount52, newnewneutrons_mass_amount62,
                      newnewneutrons_mass_amount72, newnewneutrons_mass_amount82,
                      newnewneutrons_mass_amount92,

                      newnewneutrons_mass_amount13, newnewneutrons_mass_amount23,
                      newnewneutrons_mass_amount33, newnewneutrons_mass_amount43,
                      newnewneutrons_mass_amount53, newnewneutrons_mass_amount63,
                      newnewneutrons_mass_amount73, newnewneutrons_mass_amount83,
                      newnewneutrons_mass_amount93,

                      newnewneutrons_mass_amount14, newnewneutrons_mass_amount24,
                      newnewneutrons_mass_amount34, newnewneutrons_mass_amount44,
                      newnewneutrons_mass_amount54, newnewneutrons_mass_amount64,
                      newnewneutrons_mass_amount74, newnewneutrons_mass_amount84,
                      newnewneutrons_mass_amount94,

                      newnewneutrons_mass_amount15, newnewneutrons_mass_amount25,
                      newnewneutrons_mass_amount35, newnewneutrons_mass_amount45,
                      newnewneutrons_mass_amount55, newnewneutrons_mass_amount65,
                      newnewneutrons_mass_amount75, newnewneutrons_mass_amount85,
                      newnewneutrons_mass_amount95,

                      newnewneutrons_volume_amount12, newnewneutrons_volume_amount22,
                      newnewneutrons_volume_amount32, newnewneutrons_volume_amount42,
                      newnewneutrons_volume_amount52, newnewneutrons_volume_amount62,
                      newnewneutrons_volume_amount72, newnewneutrons_volume_amount82,
                      newnewneutrons_volume_amount92,

                      newnewneutrons_volume_amount13, newnewneutrons_volume_amount23,
                      newnewneutrons_volume_amount33, newnewneutrons_volume_amount43,
                      newnewneutrons_volume_amount53, newnewneutrons_volume_amount63,
                      newnewneutrons_volume_amount73, newnewneutrons_volume_amount83,
                      newnewneutrons_volume_amount93,

                      newnewneutrons_volume_amount14, newnewneutrons_volume_amount24,
                      newnewneutrons_volume_amount34, newnewneutrons_volume_amount44,
                      newnewneutrons_volume_amount54, newnewneutrons_volume_amount64,
                      newnewneutrons_volume_amount74, newnewneutrons_volume_amount84,
                      newnewneutrons_volume_amount94,

                      newnewneutrons_volume_amount15, newnewneutrons_volume_amount25,
                      newnewneutrons_volume_amount35, newnewneutrons_volume_amount45,
                      newnewneutrons_volume_amount55, newnewneutrons_volume_amount65,
                      newnewneutrons_volume_amount75, newnewneutrons_volume_amount85,
                      newnewneutrons_volume_amount95)

# The movement of charged particles is taken into account, only
class PsnewneutronCycles():
    def __init__ (self, psnewnewneutrons_charge_amount12, psnewnewneutrons_charge_amount22,
                  psnewnewneutrons_charge_amount32, psnewnewneutrons_charge_amount42,
                  psnewnewneutrons_charge_amount52, psnewnewneutrons_charge_amount62,
                  psnewnewneutrons_charge_amount72, psnewnewneutrons_charge_amount82,
                  psnewnewneutrons_charge_amount92,

                  psnewnewneutrons_charge_amount13, psnewnewneutrons_charge_amount23,
                  psnewnewneutrons_charge_amount33, psnewnewneutrons_charge_amount43,
                  psnewnewneutrons_charge_amount53, psnewnewneutrons_charge_amount63,
                  psnewnewneutrons_charge_amount73, psnewnewneutrons_charge_amount83,
                  psnewnewneutrons_charge_amount93,

                  psnewnewneutrons_charge_amount14, psnewnewneutrons_charge_amount24,
                  psnewnewneutrons_charge_amount34, psnewnewneutrons_charge_amount44,
                  psnewnewneutrons_charge_amount54, psnewnewneutrons_charge_amount64,
                  psnewnewneutrons_charge_amount74, psnewnewneutrons_charge_amount84,
                  psnewnewneutrons_charge_amount94,

                  psnewnewneutrons_mass_amount12, psnewnewneutrons_mass_amount22,
                  psnewnewneutrons_mass_amount32, psnewnewneutrons_mass_amount42,
                  psnewnewneutrons_mass_amount52, psnewnewneutrons_mass_amount62,
                  psnewnewneutrons_mass_amount72, psnewnewneutrons_mass_amount82,
                  psnewnewneutrons_mass_amount92,

                  psnewnewneutrons_mass_amount13, psnewnewneutrons_mass_amount23,
                  psnewnewneutrons_mass_amount33, psnewnewneutrons_mass_amount43,
                  psnewnewneutrons_mass_amount53, psnewnewneutrons_mass_amount63,
                  psnewnewneutrons_mass_amount73, psnewnewneutrons_mass_amount83,
                  psnewnewneutrons_mass_amount93,
                  psnewnewneutrons_mass_amount14, psnewnewneutrons_mass_amount24,
                  psnewnewneutrons_mass_amount34, psnewnewneutrons_mass_amount44,
                  psnewnewneutrons_mass_amount54, psnewnewneutrons_mass_amount64,
                  psnewnewneutrons_mass_amount74, psnewnewneutrons_mass_amount84,
                  psnewnewneutrons_mass_amount94,

                  psnewnewneutrons_volume_amount12, psnewnewneutrons_volume_amount22,
                  psnewnewneutrons_volume_amount32, psnewnewneutrons_volume_amount42,
                  psnewnewneutrons_volume_amount52, psnewnewneutrons_volume_amount62,
                  psnewnewneutrons_volume_amount72, psnewnewneutrons_volume_amount82,
                  psnewnewneutrons_volume_amount92,

                  psnewnewneutrons_volume_amount13, psnewnewneutrons_volume_amount23,
                  psnewnewneutrons_volume_amount33, psnewnewneutrons_volume_amount43,
                  psnewnewneutrons_volume_amount53, psnewnewneutrons_volume_amount63,
                  psnewnewneutrons_volume_amount73, psnewnewneutrons_volume_amount83,
                  psnewnewneutrons_volume_amount93,

                  psnewnewneutrons_volume_amount14, psnewnewneutrons_volume_amount24,
                  psnewnewneutrons_volume_amount34, psnewnewneutrons_volume_amount44,
                  psnewnewneutrons_volume_amount54, psnewnewneutrons_volume_amount64,
                  psnewnewneutrons_volume_amount74, psnewnewneutrons_volume_amount84,
                  psnewnewneutrons_volume_amount94):

        self.psnewnewneutrons_charge_amount12 = psnewnewneutrons_charge_amount12
        self.psnewnewneutrons_charge_amount22 = psnewnewneutrons_charge_amount22
        self.psnewnewneutrons_charge_amount32 = psnewnewneutrons_charge_amount32
        self.psnewnewneutrons_charge_amount42 = psnewnewneutrons_charge_amount42
        self.psnewnewneutrons_charge_amount52 = psnewnewneutrons_charge_amount52
        self.psnewnewneutrons_charge_amount62 = psnewnewneutrons_charge_amount62
        self.psnewnewneutrons_charge_amount72 = psnewnewneutrons_charge_amount72
        self.psnewnewneutrons_charge_amount82 = psnewnewneutrons_charge_amount82
        self.psnewnewneutrons_charge_amount92 = psnewnewneutrons_charge_amount92

        self.psnewnewneutrons_charge_amount13 = psnewnewneutrons_charge_amount13
        self.psnewnewneutrons_charge_amount23 = psnewnewneutrons_charge_amount23
        self.psnewnewneutrons_charge_amount33 = psnewnewneutrons_charge_amount33
        self.psnewnewneutrons_charge_amount43 = psnewnewneutrons_charge_amount43
        self.psnewnewneutrons_charge_amount53 = psnewnewneutrons_charge_amount53
        self.psnewnewneutrons_charge_amount63 = psnewnewneutrons_charge_amount63
        self.psnewnewneutrons_charge_amount73 = psnewnewneutrons_charge_amount73
        self.psnewnewneutrons_charge_amount83 = psnewnewneutrons_charge_amount83
        self.psnewnewneutrons_charge_amount93 = psnewnewneutrons_charge_amount93

        self.psnewnewneutrons_charge_amount14 = psnewnewneutrons_charge_amount14
        self.psnewnewneutrons_charge_amount24 = psnewnewneutrons_charge_amount24
        self.psnewnewneutrons_charge_amount34 = psnewnewneutrons_charge_amount34
        self.psnewnewneutrons_charge_amount44 = psnewnewneutrons_charge_amount44
        self.psnewnewneutrons_charge_amount54 = psnewnewneutrons_charge_amount54
        self.psnewnewneutrons_charge_amount64 = psnewnewneutrons_charge_amount64
        self.psnewnewneutrons_charge_amount74 = psnewnewneutrons_charge_amount74
        self.psnewnewneutrons_charge_amount84 = psnewnewneutrons_charge_amount84
        self.psnewnewneutrons_charge_amount94 = psnewnewneutrons_charge_amount94

        self.psnewnewneutrons_mass_amount12 = psnewnewneutrons_mass_amount12
        self.psnewnewneutrons_mass_amount22 = psnewnewneutrons_mass_amount22
        self.psnewnewneutrons_mass_amount32 = psnewnewneutrons_mass_amount32
        self.psnewnewneutrons_mass_amount42 = psnewnewneutrons_mass_amount42
        self.psnewnewneutrons_mass_amount52 = psnewnewneutrons_mass_amount52
        self.psnewnewneutrons_mass_amount62 = psnewnewneutrons_mass_amount62
        self.psnewnewneutrons_mass_amount72 = psnewnewneutrons_mass_amount72
        self.psnewnewneutrons_mass_amount82 = psnewnewneutrons_mass_amount82
        self.psnewnewneutrons_mass_amount92 = psnewnewneutrons_mass_amount92
        self.psnewnewneutrons_mass_amount13 = psnewnewneutrons_mass_amount13
        self.psnewnewneutrons_mass_amount23 = psnewnewneutrons_mass_amount23
        self.psnewnewneutrons_mass_amount33 = psnewnewneutrons_mass_amount33
        self.psnewnewneutrons_mass_amount43 = psnewnewneutrons_mass_amount43
        self.psnewnewneutrons_mass_amount53 = psnewnewneutrons_mass_amount53
        self.psnewnewneutrons_mass_amount63 = psnewnewneutrons_mass_amount63
        self.psnewnewneutrons_mass_amount73 = psnewnewneutrons_mass_amount73
        self.psnewnewneutrons_mass_amount83 = psnewnewneutrons_mass_amount83
        self.psnewnewneutrons_mass_amount93 = psnewnewneutrons_mass_amount93

        self.psnewnewneutrons_mass_amount14 = psnewnewneutrons_mass_amount14
        self.psnewnewneutrons_mass_amount24 = psnewnewneutrons_mass_amount24
        self.psnewnewneutrons_mass_amount34 = psnewnewneutrons_mass_amount34
        self.psnewnewneutrons_mass_amount44 = psnewnewneutrons_mass_amount44
        self.psnewnewneutrons_mass_amount54 = psnewnewneutrons_mass_amount54
        self.psnewnewneutrons_mass_amount64 = psnewnewneutrons_mass_amount64
        self.psnewnewneutrons_mass_amount74 = psnewnewneutrons_mass_amount74
        self.psnewnewneutrons_mass_amount84 = psnewnewneutrons_mass_amount84
        self.psnewnewneutrons_mass_amount94 = psnewnewneutrons_mass_amount94

        self.psnewnewneutrons_volume_amount12 = psnewnewneutrons_volume_amount12
        self.psnewnewneutrons_volume_amount22 = psnewnewneutrons_volume_amount22
        self.psnewnewneutrons_volume_amount32 = psnewnewneutrons_volume_amount32
        self.psnewnewneutrons_volume_amount42 = psnewnewneutrons_volume_amount42
        self.psnewnewneutrons_volume_amount52 = psnewnewneutrons_volume_amount52
        self.psnewnewneutrons_volume_amount62 = psnewnewneutrons_volume_amount62
        self.psnewnewneutrons_volume_amount72 = psnewnewneutrons_volume_amount72
        self.psnewnewneutrons_volume_amount82 = psnewnewneutrons_volume_amount82
        self.psnewnewneutrons_volume_amount92 = psnewnewneutrons_volume_amount92

        self.psnewnewneutrons_volume_amount13 = psnewnewneutrons_volume_amount13
        self.psnewnewneutrons_volume_amount23 = psnewnewneutrons_volume_amount23
        self.psnewnewneutrons_volume_amount33 = psnewnewneutrons_volume_amount33
        self.psnewnewneutrons_volume_amount43 = psnewnewneutrons_volume_amount43
        self.psnewnewneutrons_volume_amount53 = psnewnewneutrons_volume_amount53
        self.psnewnewneutrons_volume_amount63 = psnewnewneutrons_volume_amount63
        self.psnewnewneutrons_volume_amount73 = psnewnewneutrons_volume_amount73
        self.psnewnewneutrons_volume_amount83 = psnewnewneutrons_volume_amount83
        self.psnewnewneutrons_volume_amount93 = psnewnewneutrons_volume_amount93

        self.psnewnewneutrons_volume_amount14 = psnewnewneutrons_volume_amount14
        self.psnewnewneutrons_volume_amount24 = psnewnewneutrons_volume_amount24
        self.psnewnewneutrons_volume_amount34 = psnewnewneutrons_volume_amount34
        self.psnewnewneutrons_volume_amount44 = psnewnewneutrons_volume_amount44
        self.psnewnewneutrons_volume_amount54 = psnewnewneutrons_volume_amount54
        self.psnewnewneutrons_volume_amount64 = psnewnewneutrons_volume_amount64
        self.psnewnewneutrons_volume_amount74 = psnewnewneutrons_volume_amount74
        self.psnewnewneutrons_volume_amount84 = psnewnewneutrons_volume_amount84
        self.psnewnewneutrons_volume_amount94 = psnewnewneutrons_volume_amount94


# Second phase

# Change in electrical charges across shells
psnewnewneutrons_charge_amount12 = 0
psnewnewneutrons_charge_amount22 = psnewnewneutrons[1].charge +\
psnewnewneutrons[0].charge
psnewnewneutrons_charge_amount32 = psnewnewneutrons[2].charge
# Due to the repulsive forces of electric charges in 5 and 6 shells
psnewnewneutrons_charge_amount42 = psnewnewneutrons[3].charge +\
psnewnewneutrons[4].charge
psnewnewneutrons_charge_amount52 = 0
psnewnewneutrons_charge_amount62 = 0
psnewnewneutrons_charge_amount72 = psnewnewneutrons[6].charge +\
psnewnewneutrons[5].charge
```

```
psnewnewneutrons_charge_amount82 = psnewnewneutrons[7].charge
psnewnewneutrons_charge_amount92 = psnewnewneutrons[8].charge

# Mass change over shells
psnewnewneutrons_mass_amount12 = psnewnewneutrons[0].mass -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewneutrons[0].charge

psnewnewneutrons_mass_amount22 = psnewnewneutrons[1].mass +\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewneutrons[1].charge + psnewnewneutrons[0].charge)

psnewnewneutrons_mass_amount32 = psnewnewneutrons[2].mass

psnewnewneutrons_mass_amount42 = psnewnewneutrons[3].mass +\
abs(melectron_mass_amount/melectron_charge_amount *\
    (psnewnewneutrons[3].charge + psnewnewneutrons[4].charge))

psnewnewneutrons_mass_amount52 = psnewnewneutrons[4].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewneutrons[4].charge)

psnewnewneutrons_mass_amount62 = psnewnewneutrons[5].mass -\
melectron_mass_amount/melectron_charge_amount *\
abs(psnewnewneutrons[5].charge)

psnewnewneutrons_mass_amount72 = psnewnewneutrons[6].mass - \
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewneutrons[6].charge + psnewnewneutrons[5].charge)

psnewnewneutrons_mass_amount82 = psnewnewneutrons[7].mass

psnewnewneutrons_mass_amount92 = psnewnewneutrons[8].mass

# Volume change over shells
psnewnewneutrons_volume_amount12 = psnewnewneutrons[0].volume -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewneutrons[0].charge

psnewnewneutrons_volume_amount22 = psnewnewneutrons[1].volume +\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewneutrons[1].charge + psnewnewneutrons[0].charge)

psnewnewneutrons_volume_amount32 = psnewnewneutrons[2].volume

psnewnewneutrons_volume_amount42 = psnewnewneutrons[3].volume +\
abs(melectron_volume_amount/melectron_charge_amount *\
    (psnewnewneutrons[3].charge + psnewnewneutrons[4].charge))
psnewnewneutrons_volume_amount52 = psnewnewneutrons[4].volume -\
melectron_volume_amount/melectron_charge_amount *\
abs(psnewnewneutrons[4].charge)

psnewnewneutrons_volume_amount62 = psnewnewneutrons[5].volume -\
melectron_volume_amount/melectron_charge_amount *\
abs(psnewnewneutrons[5].charge)

psnewnewneutrons_volume_amount72 = psnewnewneutrons[6].volume - \
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewneutrons[6].charge + psnewnewneutrons[5].charge)

psnewnewneutrons_volume_amount82 = psnewnewneutrons[7].volume

psnewnewneutrons_volume_amount92 = psnewnewneutrons[8].volume
```

```
# Third phase

# Change in electrical charges across shells

psnewnewneutrons_charge_amount13 = 0
psnewnewneutrons_charge_amount23 = 0
psnewnewneutrons_charge_amount33 = psnewnewneutrons[2].charge +\
psnewnewneutrons[1].charge + psnewnewneutrons[0].charge +\
psnewnewneutrons[3].charge + psnewnewneutrons[4].charge

psnewnewneutrons_charge_amount43 = 0
psnewnewneutrons_charge_amount53 = 0
psnewnewneutrons_charge_amount63 = 0
psnewnewneutrons_charge_amount73 = 0

psnewnewneutrons_charge_amount83 = psnewnewneutrons[7].charge +\
psnewnewneutrons[6].charge + psnewnewneutrons[5].charge

psnewnewneutrons_charge_amount93 = psnewnewneutrons[8].charge

# Mass change over shells

psnewnewneutrons_mass_amount13 = psnewnewneutrons_mass_amount12
psnewnewneutrons_mass_amount23 = psnewnewneutrons[1].mass -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewneutrons[1].charge

psnewnewneutrons_mass_amount33 = psnewnewneutrons[2].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewneutrons[2].charge

psnewnewneutrons_mass_amount43 = psnewnewneutrons[3].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewneutrons[3].charge

psnewnewneutrons_mass_amount53 = psnewnewneutrons[4].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewneutrons[4].charge

psnewnewneutrons_mass_amount63 = psnewnewneutrons[5].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewneutrons[5].charge

psnewnewneutrons_mass_amount73 = psnewnewneutrons[6].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewneutrons[6].charge

psnewnewneutrons_mass_amount83 = psnewnewneutrons[7].mass +\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewneutrons[7].charge +\
    psnewnewneutrons[6].charge + psnewnewneutrons[5].charge)

psnewnewneutrons_mass_amount93 = psnewnewneutrons[8].mass

# Volume change over shells

psnewnewneutrons_volume_amount13 = psnewnewneutrons_volume_amount12
psnewnewneutrons_volume_amount23 = psnewnewneutrons[1].volume -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewneutrons[1].charge

psnewnewneutrons_volume_amount33 = psnewnewneutrons[2].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewneutrons[2].charge
```

```
psnewnewneutrons_volume_amount43 = psnewnewneutrons[3].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewneutrons[3].charge

psnewnewneutrons_volume_amount53 = psnewnewneutrons[4].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewneutrons[4].charge

psnewnewneutrons_volume_amount63 = psnewnewneutrons[5].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewneutrons[5].charge

psnewnewneutrons_volume_amount73 = psnewnewneutrons[6].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewneutrons[6].charge

psnewnewneutrons_volume_amount83 = psnewnewneutrons[7].volume +\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewneutrons[7].charge +\
    psnewnewneutrons[6].charge + psnewnewneutrons[5].charge)

psnewnewneutrons_volume_amount93 = psnewnewneutrons[8].volume

# Fourth phase

# Change in electrical charges across shells

psnewnewneutrons_charge_amount14 = 0
psnewnewneutrons_charge_amount24 = 0
psnewnewneutrons_charge_amount34 = 0

psnewnewneutrons_charge_amount44 = 0
psnewnewneutrons_charge_amount54 = 0
psnewnewneutrons_charge_amount64 = 0
psnewnewneutrons_charge_amount74 = 0

psnewnewneutrons_charge_amount84 = 0

psnewnewneutrons_charge_amount94 = 0

# Mass change over shells

psnewnewneutrons_mass_amount14 = psnewnewneutrons_mass_amount13
psnewnewneutrons_mass_amount24 = psnewnewneutrons_mass_amount23
psnewnewneutrons_mass_amount34 = psnewnewneutrons[2].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewneutrons[2].charge)

psnewnewneutrons_mass_amount44 = psnewnewneutrons_mass_amount43
psnewnewneutrons_mass_amount54 = psnewnewneutrons_mass_amount53
psnewnewneutrons_mass_amount64 = psnewnewneutrons_mass_amount63
psnewnewneutrons_mass_amount74 = psnewnewneutrons_mass_amount73

psnewnewneutrons_mass_amount84 = psnewnewneutrons[7].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewneutrons[7].charge)

psnewnewneutrons_mass_amount94 = psnewnewneutrons[8].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewneutrons[8].charge)

# Volume change over shells

psnewnewneutrons_volume_amount14 = psnewnewneutrons_volume_amount13
psnewnewneutrons_volume_amount24 = psnewnewneutrons_volume_amount23
```

```
psnewnewneutrons_volume_amount34 = psnewnewneutrons[2].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewneutrons[2].charge)

psnewnewneutrons_volume_amount44 = psnewnewneutrons_volume_amount43
psnewnewneutrons_volume_amount54 = psnewnewneutrons_volume_amount53
psnewnewneutrons_volume_amount64 = psnewnewneutrons_volume_amount63
psnewnewneutrons_volume_amount74 = psnewnewneutrons_volume_amount73

psnewnewneutrons_volume_amount84 = psnewnewneutrons[7].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewneutrons[7].charge)

psnewnewneutrons_volume_amount94 = psnewnewneutrons[8].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewneutrons[8].charge)

unit21 = PsnewneutronCycles(psnewnewneutrons_charge_amount12, psnewnewneutrons_charge_amount22,
                         psnewnewneutrons_charge_amount32, psnewnewneutrons_charge_amount42,
                         psnewnewneutrons_charge_amount52, psnewnewneutrons_charge_amount62,
                         psnewnewneutrons_charge_amount72, psnewnewneutrons_charge_amount82,
                         psnewnewneutrons_charge_amount92,

                         psnewnewneutrons_charge_amount13, psnewnewneutrons_charge_amount23,
                         psnewnewneutrons_charge_amount33, psnewnewneutrons_charge_amount43,
                         psnewnewneutrons_charge_amount53, psnewnewneutrons_charge_amount63,
                         psnewnewneutrons_charge_amount73, psnewnewneutrons_charge_amount83,
                         psnewnewneutrons_charge_amount93,

                         psnewnewneutrons_charge_amount14, psnewnewneutrons_charge_amount24,
                         psnewnewneutrons_charge_amount34, psnewnewneutrons_charge_amount44,
                         psnewnewneutrons_charge_amount54, psnewnewneutrons_charge_amount64,
                         psnewnewneutrons_charge_amount74, psnewnewneutrons_charge_amount84,
                         psnewnewneutrons_charge_amount94,

                         psnewnewneutrons_mass_amount12, psnewnewneutrons_mass_amount22,
                         psnewnewneutrons_mass_amount32, psnewnewneutrons_mass_amount42,
                         psnewnewneutrons_mass_amount52, psnewnewneutrons_mass_amount62,
                         psnewnewneutrons_mass_amount72, psnewnewneutrons_mass_amount82,
                         psnewnewneutrons_mass_amount92,

                         psnewnewneutrons_mass_amount13, psnewnewneutrons_mass_amount23,
                         psnewnewneutrons_mass_amount33, psnewnewneutrons_mass_amount43,
                         psnewnewneutrons_mass_amount53, psnewnewneutrons_mass_amount63,
                         psnewnewneutrons_mass_amount73, psnewnewneutrons_mass_amount83,
                         psnewnewneutrons_mass_amount93,

                         psnewnewneutrons_mass_amount14, psnewnewneutrons_mass_amount24,
                         psnewnewneutrons_mass_amount34, psnewnewneutrons_mass_amount44,
                         psnewnewneutrons_mass_amount54, psnewnewneutrons_mass_amount64,
                         psnewnewneutrons_mass_amount74, psnewnewneutrons_mass_amount84,
                         psnewnewneutrons_mass_amount94,

                         psnewnewneutrons_volume_amount12, psnewnewneutrons_volume_amount22,
                         psnewnewneutrons_volume_amount32, psnewnewneutrons_volume_amount42,
                         psnewnewneutrons_volume_amount52, psnewnewneutrons_volume_amount62,
                         psnewnewneutrons_volume_amount72, psnewnewneutrons_volume_amount82,
                         psnewnewneutrons_volume_amount92,

                         psnewnewneutrons_volume_amount13, psnewnewneutrons_volume_amount23,
                         psnewnewneutrons_volume_amount33, psnewnewneutrons_volume_amount43,
                         psnewnewneutrons_volume_amount53, psnewnewneutrons_volume_amount63,
                         psnewnewneutrons_volume_amount73, psnewnewneutrons_volume_amount83,
                         psnewnewneutrons_volume_amount93,
                         psnewnewneutrons_volume_amount14, psnewnewneutrons_volume_amount24,
                         psnewnewneutrons_volume_amount34, psnewnewneutrons_volume_amount44,
                         psnewnewneutrons_volume_amount54, psnewnewneutrons_volume_amount64,
                         psnewnewneutrons_volume_amount74, psnewnewneutrons_volume_amount84,
                         psnewnewneutrons_volume_amount94)

# The movement of charged particles is taken into account, only
class PsnewnewprotonsCycles():
    def __init__ (self, psnewnewprotons_charge_amount12, psnewnewprotons_charge_amount22,
                  psnewnewprotons_charge_amount32, psnewnewprotons_charge_amount42,
                  psnewnewprotons_charge_amount52, psnewnewprotons_charge_amount62,
                  psnewnewprotons_charge_amount72, psnewnewprotons_charge_amount82,
                  psnewnewprotons_charge_amount92,

                  psnewnewprotons_charge_amount13, psnewnewprotons_charge_amount23,
                  psnewnewprotons_charge_amount33, psnewnewprotons_charge_amount43,
                  psnewnewprotons_charge_amount53, psnewnewprotons_charge_amount63,
                  psnewnewprotons_charge_amount73, psnewnewprotons_charge_amount83,
                  psnewnewprotons_charge_amount93,

                  psnewnewprotons_charge_amount14, psnewnewprotons_charge_amount24,
                  psnewnewprotons_charge_amount34, psnewnewprotons_charge_amount44,
                  psnewnewprotons_charge_amount54, psnewnewprotons_charge_amount64,
                  psnewnewprotons_charge_amount74, psnewnewprotons_charge_amount84,
                  psnewnewprotons_charge_amount94,

                  psnewnewprotons_mass_amount12, psnewnewprotons_mass_amount22,
                  psnewnewprotons_mass_amount32, psnewnewprotons_mass_amount42,
                  psnewnewprotons_mass_amount52, psnewnewprotons_mass_amount62,
                  psnewnewprotons_mass_amount72, psnewnewprotons_mass_amount82,
                  psnewnewprotons_mass_amount92,

                  psnewnewprotons_mass_amount13, psnewnewprotons_mass_amount23,
                  psnewnewprotons_mass_amount33, psnewnewprotons_mass_amount43,
                  psnewnewprotons_mass_amount53, psnewnewprotons_mass_amount63,
                  psnewnewprotons_mass_amount73, psnewnewprotons_mass_amount83,
                  psnewnewprotons_mass_amount93,

                  psnewnewprotons_mass_amount14, psnewnewprotons_mass_amount24,
                  psnewnewprotons_mass_amount34, psnewnewprotons_mass_amount44,
                  psnewnewprotons_mass_amount54, psnewnewprotons_mass_amount64,
                  psnewnewprotons_mass_amount74, psnewnewprotons_mass_amount84,
                  psnewnewprotons_mass_amount94,

                  psnewnewprotons_volume_amount12, psnewnewprotons_volume_amount22,
                  psnewnewprotons_volume_amount32, psnewnewprotons_volume_amount42,
                  psnewnewprotons_volume_amount52, psnewnewprotons_volume_amount62,
                  psnewnewprotons_volume_amount72, psnewnewprotons_volume_amount82,
                  psnewnewprotons_volume_amount92,

                  psnewnewprotons_volume_amount13, psnewnewprotons_volume_amount23,
                  psnewnewprotons_volume_amount33, psnewnewprotons_volume_amount43,
                  psnewnewprotons_volume_amount53, psnewnewprotons_volume_amount63,
                  psnewnewprotons_volume_amount73, psnewnewprotons_volume_amount83,
                  psnewnewprotons_volume_amount93,

                  psnewnewprotons_volume_amount14, psnewnewprotons_volume_amount24,
                  psnewnewprotons_volume_amount34, psnewnewprotons_volume_amount44,
                  psnewnewprotons_volume_amount54, psnewnewprotons_volume_amount64,
                  psnewnewprotons_volume_amount74, psnewnewprotons_volume_amount84,
                  psnewnewprotons_volume_amount94):

        self.psnewnewprotons_charge_amount12 = psnewnewprotons_charge_amount12
        self.psnewnewprotons_charge_amount22 = psnewnewprotons_charge_amount22
        self.psnewnewprotons_charge_amount32 = psnewnewprotons_charge_amount32
        self.psnewnewprotons_charge_amount42 = psnewnewprotons_charge_amount42
        self.psnewnewprotons_charge_amount52 = psnewnewprotons_charge_amount52
        self.psnewnewprotons_charge_amount62 = psnewnewprotons_charge_amount62
        self.psnewnewprotons_charge_amount72 = psnewnewprotons_charge_amount72
        self.psnewnewprotons_charge_amount82 = psnewnewprotons_charge_amount82
        self.psnewnewprotons_charge_amount92 = psnewnewprotons_charge_amount92

        self.psnewnewprotons_charge_amount13 = psnewnewprotons_charge_amount13
        self.psnewnewprotons_charge_amount23 = psnewnewprotons_charge_amount23
        self.psnewnewprotons_charge_amount33 = psnewnewprotons_charge_amount33
        self.psnewnewprotons_charge_amount43 = psnewnewprotons_charge_amount43
        self.psnewnewprotons_charge_amount53 = psnewnewprotons_charge_amount53
        self.psnewnewprotons_charge_amount63 = psnewnewprotons_charge_amount63
        self.psnewnewprotons_charge_amount73 = psnewnewprotons_charge_amount73
        self.psnewnewprotons_charge_amount83 = psnewnewprotons_charge_amount83
        self.psnewnewprotons_charge_amount93 = psnewnewprotons_charge_amount93

        self.psnewnewprotons_charge_amount14 = psnewnewprotons_charge_amount14
        self.psnewnewprotons_charge_amount24 = psnewnewprotons_charge_amount24
        self.psnewnewprotons_charge_amount34 = psnewnewprotons_charge_amount34
        self.psnewnewprotons_charge_amount44 = psnewnewprotons_charge_amount44
        self.psnewnewprotons_charge_amount54 = psnewnewprotons_charge_amount54
        self.psnewnewprotons_charge_amount64 = psnewnewprotons_charge_amount64
        self.psnewnewprotons_charge_amount74 = psnewnewprotons_charge_amount74
        self.psnewnewprotons_charge_amount84 = psnewnewprotons_charge_amount84
        self.psnewnewprotons_charge_amount94 = psnewnewprotons_charge_amount94

        self.psnewnewprotons_mass_amount12 = psnewnewprotons_mass_amount12
        self.psnewnewprotons_mass_amount22 = psnewnewprotons_mass_amount22
        self.psnewnewprotons_mass_amount32 = psnewnewprotons_mass_amount32
        self.psnewnewprotons_mass_amount42 = psnewnewprotons_mass_amount42
        self.psnewnewprotons_mass_amount52 = psnewnewprotons_mass_amount52
        self.psnewnewprotons_mass_amount62 = psnewnewprotons_mass_amount62
        self.psnewnewprotons_mass_amount72 = psnewnewprotons_mass_amount72
        self.psnewnewprotons_mass_amount82 = psnewnewprotons_mass_amount82
        self.psnewnewprotons_mass_amount92 = psnewnewprotons_mass_amount92

        self.psnewnewprotons_mass_amount13 = psnewnewprotons_mass_amount13
        self.psnewnewprotons_mass_amount23 = psnewnewprotons_mass_amount23
        self.psnewnewprotons_mass_amount33 = psnewnewprotons_mass_amount33
        self.psnewnewprotons_mass_amount43 = psnewnewprotons_mass_amount43
        self.psnewnewprotons_mass_amount53 = psnewnewprotons_mass_amount53
        self.psnewnewprotons_mass_amount63 = psnewnewprotons_mass_amount63
        self.psnewnewprotons_mass_amount73 = psnewnewprotons_mass_amount73
        self.psnewnewprotons_mass_amount83 = psnewnewprotons_mass_amount83
        self.psnewnewprotons_mass_amount93 = psnewnewprotons_mass_amount93

        self.psnewnewprotons_mass_amount14 = psnewnewprotons_mass_amount14
        self.psnewnewprotons_mass_amount24 = psnewnewprotons_mass_amount24
        self.psnewnewprotons_mass_amount34 = psnewnewprotons_mass_amount34
        self.psnewnewprotons_mass_amount44 = psnewnewprotons_mass_amount44
        self.psnewnewprotons_mass_amount54 = psnewnewprotons_mass_amount54
        self.psnewnewprotons_mass_amount64 = psnewnewprotons_mass_amount64
        self.psnewnewprotons_mass_amount74 = psnewnewprotons_mass_amount74
        self.psnewnewprotons_mass_amount84 = psnewnewprotons_mass_amount84
        self.psnewnewprotons_mass_amount94 = psnewnewprotons_mass_amount94

        self.psnewnewprotons_volume_amount12 = psnewnewprotons_volume_amount12
        self.psnewnewprotons_volume_amount22 = psnewnewprotons_volume_amount22
        self.psnewnewprotons_volume_amount32 = psnewnewprotons_volume_amount32
        self.psnewnewprotons_volume_amount42 = psnewnewprotons_volume_amount42
        self.psnewnewprotons_volume_amount52 = psnewnewprotons_volume_amount52
        self.psnewnewprotons_volume_amount62 = psnewnewprotons_volume_amount62
        self.psnewnewprotons_volume_amount72 = psnewnewprotons_volume_amount72
        self.psnewnewprotons_volume_amount82 = psnewnewprotons_volume_amount82
        self.psnewnewprotons_volume_amount92 = psnewnewprotons_volume_amount92

        self.psnewnewprotons_volume_amount13 = psnewnewprotons_volume_amount13
        self.psnewnewprotons_volume_amount23 = psnewnewprotons_volume_amount23
        self.psnewnewprotons_volume_amount33 = psnewnewprotons_volume_amount33
        self.psnewnewprotons_volume_amount43 = psnewnewprotons_volume_amount43
        self.psnewnewprotons_volume_amount53 = psnewnewprotons_volume_amount53
        self.psnewnewprotons_volume_amount63 = psnewnewprotons_volume_amount63
        self.psnewnewprotons_volume_amount73 = psnewnewprotons_volume_amount73
        self.psnewnewprotons_volume_amount83 = psnewnewprotons_volume_amount83
        self.psnewnewprotons_volume_amount93 = psnewnewprotons_volume_amount93

        self.psnewnewprotons_volume_amount14 = psnewnewprotons_volume_amount14
        self.psnewnewprotons_volume_amount24 = psnewnewprotons_volume_amount24
        self.psnewnewprotons_volume_amount34 = psnewnewprotons_volume_amount34
        self.psnewnewprotons_volume_amount44 = psnewnewprotons_volume_amount44
        self.psnewnewprotons_volume_amount54 = psnewnewprotons_volume_amount54
        self.psnewnewprotons_volume_amount64 = psnewnewprotons_volume_amount64
        self.psnewnewprotons_volume_amount74 = psnewnewprotons_volume_amount74
        self.psnewnewprotons_volume_amount84 = psnewnewprotons_volume_amount84
        self.psnewnewprotons_volume_amount94 = psnewnewprotons_volume_amount94


# Second phase

# Change in electrical charges across shells
psnewnewprotons_charge_amount12 = psnewnewprotons[1].charge + psnewnewprotons[0].charge
psnewnewprotons_charge_amount22 = 0
psnewnewprotons_charge_amount32 = 0

psnewnewprotons_charge_amount42 = psnewnewprotons[3].charge + psnewnewprotons[2].charge
psnewnewprotons_charge_amount52 = psnewnewprotons[4].charge
psnewnewprotons_charge_amount62 = psnewnewprotons[5].charge + psnewnewprotons[6].charge +\
psnewnewprotons[7].charge + psnewnewprotons[8].charge

psnewnewprotons_charge_amount72 = 0

psnewnewprotons_charge_amount82 = 0
psnewnewprotons_charge_amount92 = 0

# Mass change over shells
psnewnewprotons_mass_amount12 = psnewnewprotons[0].mass -\
melectron_mass_amount/melectron_charge_amount * \
(psnewnewprotons[1].charge + psnewnewprotons[0].charge)

psnewnewprotons_mass_amount22 = psnewnewprotons[1].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewprotons[1].charge)

psnewnewprotons_mass_amount32 = psnewnewprotons[2].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewprotons[2].charge)

psnewnewprotons_mass_amount42 = psnewnewprotons[3].mass -\
abs(melectron_mass_amount/melectron_charge_amount *\
    (psnewnewprotons[3].charge + psnewnewprotons[2].charge))

psnewnewprotons_mass_amount52 = psnewnewprotons[4].mass

psnewnewprotons_mass_amount62 = psnewnewprotons[5].mass

psnewnewprotons_mass_amount72 = psnewnewprotons[6].mass - \
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewprotons[6].charge +\
psnewnewprotons[7].charge + psnewnewprotons[8].charge)
```

```
psnewnewprotons_mass_amount82 = psnewnewprotons[7].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewprotons[7].charge)

psnewnewprotons_mass_amount92 = psnewnewprotons[8].mass -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewprotons[8].charge)

# Volume change over shells
psnewnewprotons_volume_amount12 = psnewnewprotons[0].volume -\
melectron_volume_amount/melectron_charge_amount * \
(psnewnewprotons[1].charge + psnewnewprotons[0].charge)

psnewnewprotons_volume_amount22 = psnewnewprotons[1].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewprotons[1].charge)

psnewnewprotons_volume_amount32 = psnewnewprotons[2].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewprotons[2].charge)

psnewnewprotons_volume_amount42 = psnewnewprotons[3].volume -\
abs(melectron_volume_amount/melectron_charge_amount *\
    (psnewnewprotons[3].charge + psnewnewprotons[2].charge))

psnewnewprotons_volume_amount52 = psnewnewprotons[4].volume

psnewnewprotons_volume_amount62 = psnewnewprotons[5].volume

psnewnewprotons_volume_amount72 = psnewnewprotons[6].volume - \
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewprotons[6].charge +\
psnewnewprotons[7].charge + psnewnewprotons[8].charge)

psnewnewprotons_volume_amount82 = psnewnewprotons[7].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewprotons[7].charge)

psnewnewprotons_volume_amount92 = psnewnewprotons[8].volume -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewprotons[8].charge)

# Third phase

# Change in electrical charges across shells

psnewnewprotons_charge_amount13 = psnewnewprotons_charge_amount12
psnewnewprotons_charge_amount23 = 0
psnewnewprotons_charge_amount33 = 0

psnewnewprotons_charge_amount43 = 0
psnewnewprotons_charge_amount53 = psnewnewprotons[4].charge + \
psnewnewprotons[3].charge + psnewnewprotons[2].charge

psnewnewprotons_charge_amount63 = 0
psnewnewprotons_charge_amount73 = 0

psnewnewprotons_charge_amount83 = 0

psnewnewprotons_charge_amount93 = 0

# Mass change over shells

psnewnewprotons_mass_amount13 = psnewnewprotons_mass_amount12
```

```
psnewnewprotons_mass_amount23 = psnewnewprotons[1].mass -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[1].charge

psnewnewprotons_mass_amount33 = psnewnewprotons[2].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[2].charge

psnewnewprotons_mass_amount43 = psnewnewprotons[3].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[3].charge

psnewnewprotons_mass_amount53 = psnewnewprotons[4].mass  -\
melectron_mass_amount/melectron_charge_amount * \
abs(psnewnewprotons[4].charge - psnewnewprotons[4].charge + \
psnewnewprotons[3].charge + psnewnewprotons[2].charge)

psnewnewprotons_mass_amount63 = psnewnewprotons[5].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[5].charge

psnewnewprotons_mass_amount73 = psnewnewprotons[6].mass  -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[6].charge

psnewnewprotons_mass_amount83 = psnewnewprotons[7].mass -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[7].charge

psnewnewprotons_mass_amount93 = psnewnewprotons[8].mass -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[8].charge

# Volume change over shells

psnewnewprotons_volume_amount13 = psnewnewprotons_volume_amount12
psnewnewprotons_volume_amount23 = psnewnewprotons[1].volume -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[1].charge

psnewnewprotons_volume_amount33 = psnewnewprotons[2].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[2].charge

psnewnewprotons_volume_amount43 = psnewnewprotons[3].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[3].charge

psnewnewprotons_volume_amount53 = psnewnewprotons[4].volume  -\
melectron_volume_amount/melectron_charge_amount * \
abs(psnewnewprotons[4].charge - psnewnewprotons[4].charge + \
psnewnewprotons[3].charge + psnewnewprotons[2].charge)

psnewnewprotons_volume_amount63 = psnewnewprotons[5].volume  -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[5].charge

psnewnewprotons_volume_amount73 =psnewnewprotons[6].volume -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[6].charge

psnewnewprotons_volume_amount83 = psnewnewprotons[7].volume -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[7].charge
```

```
psnewnewprotons_volume_amount93 = psnewnewprotons[8].volume -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[8].charge

# Fourth phase

# Change in electrical charges across shells

psnewnewprotons_charge_amount14 = 0
psnewnewprotons_charge_amount24 = 0
psnewnewprotons_charge_amount34 = 0

psnewnewprotons_charge_amount44 = 0
psnewnewprotons_charge_amount54 = psnewnewprotons[4].charge + \
psnewnewprotons[3].charge + psnewnewprotons[2].charge +\
psnewnewprotons_charge_amount13

psnewnewprotons_charge_amount64 = 0
psnewnewprotons_charge_amount74 = 0

psnewnewprotons_charge_amount84 = 0

psnewnewprotons_charge_amount94 = 0

# Mass change over shells

psnewnewprotons_mass_amount14 = psnewnewprotons[0].mass -\
melectron_mass_amount/melectron_charge_amount * \
psnewnewprotons[0].charge

psnewnewprotons_mass_amount24 = psnewnewprotons_mass_amount23
psnewnewprotons_mass_amount34 = psnewnewprotons_mass_amount33

psnewnewprotons_mass_amount44 = psnewnewprotons_mass_amount43

psnewnewprotons_mass_amount54 = psnewnewprotons[4].mass -\
melectron_mass_amount/melectron_charge_amount *\
abs(psnewnewprotons[4].charge + psnewnewprotons[3].charge +\
    psnewnewprotons[2].charge + psnewnewprotons_charge_amount13)

psnewnewprotons_mass_amount64 = psnewnewprotons_mass_amount63
psnewnewprotons_mass_amount74 = psnewnewprotons_mass_amount73

psnewnewprotons_mass_amount84 = psnewnewprotons_mass_amount83

psnewnewprotons_mass_amount94 = psnewnewprotons_mass_amount93

# Volume change over shells

psnewnewprotons_volume_amount14 = psnewnewprotons[0].volume -\
melectron_volume_amount/melectron_charge_amount * \
psnewnewprotons[0].charge

psnewnewprotons_volume_amount24 = psnewnewprotons_volume_amount23
psnewnewprotons_volume_amount34 = psnewnewprotons_volume_amount33

psnewnewprotons_volume_amount44 = psnewnewprotons_volume_amount43

psnewnewprotons_volume_amount54 = psnewnewprotons[4].volume -\
melectron_volume_amount/melectron_charge_amount *\
abs(psnewnewprotons[4].charge + psnewnewprotons[3].charge +\
    psnewnewprotons[2].charge + psnewnewprotons_charge_amount13)

psnewnewprotons_volume_amount64 = psnewnewprotons_volume_amount63
psnewnewprotons_volume_amount74 = psnewnewprotons_volume_amount73
```

```
psnewnewprotons_volume_amount84 = psnewnewprotons_volume_amount83

psnewnewprotons_volume_amount94 = psnewnewprotons_volume_amount93

unit22 = PsnewnewprotonsCycles(psnewnewprotons_charge_amount12,
                               psnewnewprotons_charge_amount22,
                               psnewnewprotons_charge_amount32, psnewnewprotons_charge_amount42,
                               psnewnewprotons_charge_amount52, psnewnewprotons_charge_amount62,
                               psnewnewprotons_charge_amount72, psnewnewprotons_charge_amount82,
                               psnewnewprotons_charge_amount92,

                         psnewnewprotons_charge_amount13, psnewnewprotons_charge_amount23,
                         psnewnewprotons_charge_amount33, psnewnewprotons_charge_amount43,
                         psnewnewprotons_charge_amount53, psnewnewprotons_charge_amount63,
                         psnewnewprotons_charge_amount73, psnewnewprotons_charge_amount83,
                         psnewnewprotons_charge_amount93,

                         psnewnewprotons_charge_amount14, psnewnewprotons_charge_amount24,
                         psnewnewprotons_charge_amount34, psnewnewprotons_charge_amount44,
                         psnewnewprotons_charge_amount54, psnewnewprotons_charge_amount64,
                         psnewnewprotons_charge_amount74, psnewnewprotons_charge_amount84,
                         psnewnewprotons_charge_amount94,

                         psnewnewprotons_mass_amount12, psnewnewprotons_mass_amount22,
                         psnewnewprotons_mass_amount32, psnewnewprotons_mass_amount42,
                         psnewnewprotons_mass_amount52, psnewnewprotons_mass_amount62,
                         psnewnewprotons_mass_amount72, psnewnewprotons_mass_amount82,
                         psnewnewprotons_mass_amount92,

                         psnewnewprotons_mass_amount13, psnewnewprotons_mass_amount23,
                         psnewnewprotons_mass_amount33, psnewnewprotons_mass_amount43,
                         psnewnewprotons_mass_amount53, psnewnewprotons_mass_amount63,
                         psnewnewprotons_mass_amount73, psnewnewprotons_mass_amount83,
                         psnewnewprotons_mass_amount93,

                         psnewnewprotons_mass_amount14, psnewnewprotons_mass_amount24,
                         psnewnewprotons_mass_amount34, psnewnewprotons_mass_amount44,
                         psnewnewprotons_mass_amount54, psnewnewprotons_mass_amount64,
                         psnewnewprotons_mass_amount74, psnewnewprotons_mass_amount84,
                         psnewnewprotons_mass_amount94,

                         psnewnewprotons_volume_amount12, psnewnewprotons_volume_amount22,
                         psnewnewprotons_volume_amount32, psnewnewprotons_volume_amount42,
                         psnewnewprotons_volume_amount52, psnewnewprotons_volume_amount62,
                         psnewnewprotons_volume_amount72, psnewnewprotons_volume_amount82,
                         psnewnewprotons_volume_amount92,

                         psnewnewprotons_volume_amount13, psnewnewprotons_volume_amount23,
                         psnewnewprotons_volume_amount33, psnewnewprotons_volume_amount43,
                         psnewnewprotons_volume_amount53, psnewnewprotons_volume_amount63,
                         psnewnewprotons_volume_amount73, psnewnewprotons_volume_amount83,
                         psnewnewprotons_volume_amount93,

                         psnewnewprotons_volume_amount14, psnewnewprotons_volume_amount24,
                         psnewnewprotons_volume_amount34, psnewnewprotons_volume_amount44,
                         psnewnewprotons_volume_amount54, psnewnewprotons_volume_amount64,
                         psnewnewprotons_volume_amount74, psnewnewprotons_volume_amount84,
                         psnewnewprotons_volume_amount94)

# TEST
# Start

# Checking of the electric charge
# proton_test
if Qe - (psnewnewprotons_charge_amount14 + psnewnewprotons_charge_amount24 +\
         psnewnewprotons_charge_amount34 + psnewnewprotons_charge_amount44 +\
         psnewnewprotons_charge_amount54 + psnewnewprotons_charge_amount64 +\
         psnewnewprotons_charge_amount74 + psnewnewprotons_charge_amount84 +\
         psnewnewprotons_charge_amount94) == 0:

    k22 = Qe

#  Proton_test successful, the proton charge
#  is equal to the electron charge modulo

# new_proton_test
newnewprotons_charge = (newnewprotons_charge_amount14 + newnewprotons_charge_amount24 +\
newnewprotons_charge_amount34 + newnewprotons_charge_amount44 +\
newnewprotons_charge_amount54 + newnewprotons_charge_amount64 + \
newnewprotons_charge_amount74 + newnewprotons_charge_amount84 +\
newnewprotons_charge_amount94)
if Qe < newnewprotons_charge:
    k1 = (newnewprotons_charge - Qe)/newnewprotons_charge * 100

    k231 = k1
if Qe > newnewprotons_charge:
    k2 = (Qe - newnewprotons_charge)/Qe * 100

    k232 = ('Charge < |Qe| at', k2)
if  Qe == newnewprotons_charge:

    k233 = ('Charge = |Qe|')

# New_Proton_test successful

# neutron_test
psnewnewneutrons_charge = psnewnewneutrons_charge_amount14 +\
psnewnewneutrons_charge_amount24 +\
psnewnewneutrons_charge_amount34 + psnewnewneutrons_charge_amount44 +\
psnewnewneutrons_charge_amount54 + psnewnewneutrons_charge_amount64 +\
psnewnewneutrons_charge_amount74 + psnewnewneutrons_charge_amount84 +\
psnewnewneutrons_charge_amount94
if psnewnewneutrons_charge == 0:

    k21 = ('The neutron charge = 0')

#  Neutron_test successful, the neutron charge is zero

# new_neutron_test
newnewneutrons_charge = newnewneutrons_charge_amount15 + \
newnewneutrons_charge_amount25 +\
newnewneutrons_charge_amount35 + newnewneutrons_charge_amount45 +\
newnewneutrons_charge_amount55 + newnewneutrons_charge_amount65 +\
newnewneutrons_charge_amount75 + newnewneutrons_charge_amount85 +\
newnewneutrons_charge_amount95
if newnewneutrons_charge > 0:

    k24 =  newnewneutrons_charge

# New neutron charge is larger to the zero at newnewneutrons_charge

# END OF TEST


# Visualization

# The electric charge of the quark "u" and quark "d" by shells
```

```
masp35 = ([psuq11, psuq21, psuq31])
ph1 = ([0.95, 1.95, 2.95])
ph = ([1, 2, 3])
plt.figure(figsize=(12,8))
plt.plot(ph, masp35, color = "green")
plt.bar(ph1, masp35, color = "lightgray")

grid(True)

masp36 = ([psdq11, psdq21, psdq31])

ph = ([1, 2, 3])
ph2 = ([1.05, 2.05, 3.05])
plt.plot(ph, masp36, color = "r")
plt.bar(ph2, masp36, color = "gray")

fig38 = plt.xlabel(
    'Graph # 1. Shell number \n \n'
    'The electric charge: of the quark "u" - lightgray, and quark "d" - gray by shells \n \n',
    fontsize=18)
fig38 = plt.ylabel('Electric charge in Cl x E-19', fontsize=18)
grid(True)

# The electric charge of the new quark "u" and new quark "d" by shells

masp35 = ([uq11, uq21, uq31])
ph1 = ([0.95, 1.95, 2.95])
ph = ([1, 2, 3])
plt.figure(figsize=(12,8))
plt.plot(ph, masp35, color = "green")
plt.bar(ph1, masp35, color = "lightgray")

grid(True)

masp36 = ([dq11, dq21, dq31])

ph = ([1, 2, 3])
ph2 = ([1.05, 2.05, 3.05])
plt.plot(ph, masp36, color = "r")
plt.bar(ph2, masp36, color = "gray")

fig38 = plt.xlabel(
    'Graph # 2. Shell number \n \n'
    'The electric charge: of the new quark "u" - lightgray, and new quark "d" - gray by
shells\n\n',
    fontsize=18)
fig38 = plt.ylabel('Electric charge in Cl x E-20', fontsize=18)
grid(True)

# The mass of the quark "u" and quark "d" by shells

masp35 = ([psum1, psum2, psum3])
ph1 = ([0.95, 1.95, 2.95])
ph = ([0.98, 1.98, 2.98])
plt.figure(figsize=(12,8))
plt.plot(ph, masp35, color = "green")
plt.bar(ph1, masp35, color = "lightgray")

grid(True)

masp36 = ([psdm1, psdm2, psdm3])

ph = ([1.02, 2.02, 3.02])
ph2 = ([1.05, 2.05, 3.05])
plt.plot(ph, masp36, color = "r")
plt.bar(ph2, masp36, color = "gray")

fig38 = plt.xlabel(
    'Graph # 3. Shell number \n \n'
    'The mass: of the quark "u" - lightgray, and quark "d" - gray by shells \n \n',
    fontsize=18)
fig38 = plt.ylabel('Mass in kg x E-28', fontsize=18)
grid(True)

# The mass of the new quark "u" and new quark "d" by shells

masp35 = ([um1, um2, um3])
ph1 = ([0.95, 1.95, 2.95])
ph = ([0.98, 1.98, 2.98])
plt.figure(figsize=(12,8))
plt.plot(ph, masp35, color = "green")
plt.bar(ph1, masp35, color = "lightgray")

grid(True)

masp36 = ([dm1, dm2, dm3])

ph = ([1.02, 2.02, 3.02])
ph2 = ([1.05, 2.05, 3.05])
plt.plot(ph, masp36, color = "r")
plt.bar(ph2, masp36, color = "gray")

fig38 = plt.xlabel(
    'Graph # 4. Shell number \n \n'
    'The mass: of the new quark "u" - lightgray, and new quark "d" - gray by shells \n \n',
    fontsize=18)
fig38 = plt.ylabel('Mass in kg x E-28', fontsize=18)
grid(True)


# Delta between the masses of the of the neutron and proton,
# new neutron and new proton by
# shells for the first phase, 2D graph

delta = ([newnewneutrons[0].mass-newnewprotons[0].mass,
          newnewneutrons[1].mass-newnewprotons[1].mass,
          newnewneutrons[2].mass-newnewprotons[2].mass,
          newnewneutrons[3].mass-newnewprotons[3].mass,
          newnewneutrons[4].mass-newnewprotons[4].mass,
          newnewneutrons[5].mass-newnewprotons[5].mass,
          newnewneutrons[6].mass-newnewprotons[6].mass,
          newnewneutrons[7].mass-newnewprotons[7].mass,
          newnewneutrons[8].mass-newnewprotons[8].mass])
shell1 = ([0.7, 1.7, 2.7, 3.7, 4.7, 5.7, 6.7, 7.7, 8.7])
shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, delta, color = "green")
plt.bar(shell1, delta, color = "lightgray")

fig = plt.ylabel('Weight in kg * 10^-30', fontsize=18)
grid(True)

delta2 = ([psnewnewneutrons[0].mass - psnewnewprotons[0].mass,
           psnewnewneutrons[1].mass - psnewnewprotons[1].mass,
           psnewnewneutrons[2].mass - psnewnewprotons[2].mass,
           psnewnewneutrons[3].mass - psnewnewprotons[3].mass,
           psnewnewneutrons[4].mass - psnewnewprotons[4].mass,
           psnewnewneutrons[5].mass - psnewnewprotons[5].mass,
           psnewnewneutrons[6].mass - psnewnewprotons[6].mass,
           psnewnewneutrons[7].mass - psnewnewprotons[7].mass,
           psnewnewneutrons[8].mass - psnewnewprotons[8].mass])
shell2 = ([1.3, 2.3, 3.3, 4.3, 5.3, 6.3, 7.3, 8.3, 9.3])
plt.plot(shell, delta2, color = "r")
plt.bar(shell2, delta2, color = "gray")

fig2 = plt.xlabel('Graph # 5. Shell number \n \n'
                  'Delta between the masses: of the neutron and proton by shells - gray \n '
                  'of the new neutron and new proton by shells - lightgray \n \n',
                  fontsize=18)
fig2 = plt.ylabel('Weight in kg * 10^-30', fontsize=18)

grid(True)

# The masses of the proton for the first phases for the different shells, 2D graph

masp1 = ([psnewnewprotons[0].mass, psnewnewprotons[1].mass, psnewnewprotons[2].mass,
          psnewnewprotons[3].mass, psnewnewprotons[4].mass, psnewnewprotons[5].mass,
          psnewnewprotons[6].mass, psnewnewprotons[7].mass, psnewnewprotons[8].mass])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp1, color = "green")
plt.bar(shell, masp1, color = "lightgray")

fig3 = plt.xlabel(
    'Graph # 6. Shells number \n \n'
    'The masses of the proton for the first phases for the different shells \n \n',
    fontsize=18)
fig3 = plt.ylabel('Weight in kg * 10^-28', fontsize=18)
grid(True)

# Delta between the masses of the proton for the first and second phases
# for the different shells, 2D graph
# The movement of charged particles is taken into account, only
masp2 = ([psnewnewprotons[0].mass - unit22.psnewnewprotons_mass_amount12,
          psnewnewprotons[1].mass - unit22.psnewnewprotons_mass_amount22,
          psnewnewprotons[2].mass - unit22.psnewnewprotons_mass_amount32,
          psnewnewprotons[3].mass - unit22.psnewnewprotons_mass_amount42,
          psnewnewprotons[4].mass - unit22.psnewnewprotons_mass_amount52,
          psnewnewprotons[5].mass - unit22.psnewnewprotons_mass_amount62,
          psnewnewprotons[6].mass - unit22.psnewnewprotons_mass_amount72,
          psnewnewprotons[7].mass - unit22.psnewnewprotons_mass_amount82,
          psnewnewprotons[8].mass - unit22.psnewnewprotons_mass_amount92])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp2, color = "green")
plt.bar(shell, masp2, color = "lightgray")

fig4 = plt.xlabel(
    'Graph # 7. Shells number \n \n'
    'Delta between the masses of the proton for the first and second phases for the \n'
    'different shells. he movement of charged particles is taken into account, only \n \n',
    fontsize=18)
fig4 = plt.ylabel('Weight in kg * 10^-31', fontsize=18)
grid(True)

# Delta between the masses of the proton for the second and third phases
# for the different shells, 2D graph
# The movement of charged particles is taken into account

masp3 = ([unit22.psnewnewprotons_mass_amount12 - unit22.psnewnewprotons_mass_amount13,
          unit22.psnewnewprotons_mass_amount22 - unit22.psnewnewprotons_mass_amount23,
          unit22.psnewnewprotons_mass_amount32 - unit22.psnewnewprotons_mass_amount33,
          unit22.psnewnewprotons_mass_amount42 - unit22.psnewnewprotons_mass_amount43,
          unit22.psnewnewprotons_mass_amount52 - unit22.psnewnewprotons_mass_amount53,
          unit22.psnewnewprotons_mass_amount62 - unit22.psnewnewprotons_mass_amount63,
          unit22.psnewnewprotons_mass_amount72 - unit22.psnewnewprotons_mass_amount73,
          unit22.psnewnewprotons_mass_amount82 - unit22.psnewnewprotons_mass_amount83,
          unit22.psnewnewprotons_mass_amount92 - unit22.psnewnewprotons_mass_amount93])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp3, color = "green")
plt.bar(shell, masp3, color = "lightgray")

fig5 = plt.xlabel(
    'Graph # 8. Shells number \n \n'
    'Delta between the masses of the proton for the second and third phases for the \n'
    'different shells. The movement of charged particles is taken into account \n \n',
    fontsize=18)
fig5 = plt.ylabel('Weight in kg * 10^-30', fontsize=18)
grid(True)

# Delta between the masses of the proton for the third and fourth phases
# for the different shells, 2D graph
# The movement of charged particles is taken into account

masp4 = ([unit22.psnewnewprotons_mass_amount13 - unit22.psnewnewprotons_mass_amount14,
          unit22.psnewnewprotons_mass_amount23 - unit22.psnewnewprotons_mass_amount24,
          unit22.psnewnewprotons_mass_amount33 - unit22.psnewnewprotons_mass_amount34,
          unit22.psnewnewprotons_mass_amount43 - unit22.psnewnewprotons_mass_amount44,
          unit22.psnewnewprotons_mass_amount53 - unit22.psnewnewprotons_mass_amount54,
          unit22.psnewnewprotons_mass_amount63 - unit22.psnewnewprotons_mass_amount64,
          unit22.psnewnewprotons_mass_amount73 - unit22.psnewnewprotons_mass_amount74,
          unit22.psnewnewprotons_mass_amount83 - unit22.psnewnewprotons_mass_amount84,
          unit22.psnewnewprotons_mass_amount93 - unit22.psnewnewprotons_mass_amount94])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp4, color = "green")
plt.bar(shell, masp4, color = "lightgray")

fig6 = plt.xlabel(
    'Graph # 9. Shells number \n \n'
    'Delta between the masses of the proton for the third and fourth phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig6 = plt.ylabel('Weight in kg * 10^-31', fontsize=18)
grid(True)

# Delta between the masses of the proton for the fourth and
# first phases for the different shells, 2D graph
# The movement of charged particles is taken into account

masp5 = ([unit22.psnewnewprotons_mass_amount14 - psnewnewprotons[0].mass,
          unit22.psnewnewprotons_mass_amount24 - psnewnewprotons[1].mass,
          unit22.psnewnewprotons_mass_amount34 - psnewnewprotons[2].mass,
          unit22.psnewnewprotons_mass_amount44 - psnewnewprotons[3].mass,
          unit22.psnewnewprotons_mass_amount54 - psnewnewprotons[4].mass,
          unit22.psnewnewprotons_mass_amount64 - psnewnewprotons[5].mass,
          unit22.psnewnewprotons_mass_amount74 - psnewnewprotons[6].mass,
          unit22.psnewnewprotons_mass_amount84 - psnewnewprotons[7].mass,
          unit22.psnewnewprotons_mass_amount94 - psnewnewprotons[8].mass])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp5, color = "green")
plt.bar(shell, masp5, color = "lightgray")
```

```
fig7 = plt.xlabel(
    'Graph # 10. Shells number \n \n'
    'Delta between the masses of the proton for the fourth and first phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig7 = plt.ylabel('Weight in kg * 10^-30', fontsize=18)
grid(True)

# The volume of the proton for the first phases for the different shells, 2D graph

masp11 = ([psnewnewprotons[0].volume, psnewnewprotons[1].volume,
           psnewnewprotons[2].volume,
           psnewnewprotons[3].volume, psnewnewprotons[4].volume,
           psnewnewprotons[5].volume,
           psnewnewprotons[6].volume, psnewnewprotons[7].volume,
           psnewnewprotons[8].volume])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp11, color = "green")
plt.bar(shell, masp11, color = "lightgray")

fig31 = plt.xlabel(
    'Graph # 11. Shells number \n \n'
    'The volume of the proton for the first phases for the different shells \n \n',
    fontsize=18)
fig31 = plt.ylabel('Volume in cubic meter * 10^-44', fontsize=18)
grid(True)

# The masses of the neutron for the first phases for the different shells, 2D graph

masn1 = ([psnewnewneutrons[0].mass, psnewnewneutrons[1].mass, psnewnewneutrons[2].mass,
          psnewnewneutrons[3].mass, psnewnewprotons[4].mass, psnewnewneutrons[5].mass,
          psnewnewneutrons[6].mass, psnewnewneutrons[7].mass, psnewnewneutrons[8].mass])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn1, color = "green")
plt.bar(shell, masn1, color = "lightgray")

fig3 = plt.xlabel(
    'Graph # 12. Shells number \n \n'
    'The masses of the neutron for the first phases for the different shells \n \n',
    fontsize=18)
fig3 = plt.ylabel('Weight in kg * 10^-28', fontsize=18)
grid(True)

# Delta between the masses of the neutron for the first and
# second phases for the different shells, 2D graph
# The movement of charged particles is taken into account

masn2 = ([psnewnewneutrons[0].mass - unit21.psnewnewneutrons_mass_amount12,
          psnewnewneutrons[1].mass - unit21.psnewnewneutrons_mass_amount22,
          psnewnewneutrons[2].mass - unit21.psnewnewneutrons_mass_amount32,
          psnewnewneutrons[3].mass - unit21.psnewnewneutrons_mass_amount42,
          psnewnewneutrons[4].mass - unit21.psnewnewneutrons_mass_amount52,
          psnewnewneutrons[5].mass - unit21.psnewnewneutrons_mass_amount62,
          psnewnewneutrons[6].mass - unit21.psnewnewneutrons_mass_amount72,
          psnewnewneutrons[7].mass - unit21.psnewnewneutrons_mass_amount82,
          psnewnewneutrons[8].mass - unit21.psnewnewneutrons_mass_amount92])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn2, color = "green")
plt.bar(shell, masn2, color = "lightgray")
```

```
fig4n = plt.xlabel(
    'Graph # 13. Shells number \n \n'
    'Delta between the masses of the neutron for the first and second phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig4n = plt.ylabel('Weight in kg * 10^-31', fontsize=18)
grid(True)

# Delta between the masses of the neutron for the second and third phases
# for the different shells, 2D graph
# The movement of charged particles is taken into account

masn3 = ([unit21.psnewnewneutrons_mass_amount12 - unit21.psnewnewneutrons_mass_amount13,
          unit21.psnewnewneutrons_mass_amount22 - unit21.psnewnewneutrons_mass_amount23,
          unit21.psnewnewneutrons_mass_amount32 - unit21.psnewnewneutrons_mass_amount33,
          unit21.psnewnewneutrons_mass_amount42 - unit21.psnewnewneutrons_mass_amount43,
          unit21.psnewnewneutrons_mass_amount52 - unit21.psnewnewneutrons_mass_amount53,
          unit21.psnewnewneutrons_mass_amount62 - unit21.psnewnewneutrons_mass_amount63,
          unit21.psnewnewneutrons_mass_amount72 - unit21.psnewnewneutrons_mass_amount73,
          unit21.psnewnewneutrons_mass_amount82 - unit21.psnewnewneutrons_mass_amount83,
          unit21.psnewnewneutrons_mass_amount92 - unit21.psnewnewneutrons_mass_amount93])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn3, color = "green")
plt.bar(shell, masn3, color = "lightgray")

fig5n = plt.xlabel(
    'Graph # 14. Shells number \n \n'
    'Delta between the masses of the neutron for the second and third phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig5n = plt.ylabel('Weight in kg * 10^-30', fontsize=18)
grid(True)

# Delta between the masses of the neutron for the third and
# fourth phases for the different shells, 2D graph
# The movement of charged particles is taken into account

masn4 = ([unit21.psnewnewneutrons_mass_amount13 - unit21.psnewnewneutrons_mass_amount14,
          unit21.psnewnewneutrons_mass_amount23 - unit21.psnewnewneutrons_mass_amount24,
          unit21.psnewnewneutrons_mass_amount33 - unit21.psnewnewneutrons_mass_amount34,
          unit21.psnewnewneutrons_mass_amount43 - unit21.psnewnewneutrons_mass_amount44,
          unit21.psnewnewneutrons_mass_amount53 - unit21.psnewnewneutrons_mass_amount54,
          unit21.psnewnewneutrons_mass_amount63 - unit21.psnewnewneutrons_mass_amount64,
          unit21.psnewnewneutrons_mass_amount73 - unit21.psnewnewneutrons_mass_amount74,
          unit21.psnewnewneutrons_mass_amount83 - unit21.psnewnewneutrons_mass_amount84,
          unit21.psnewnewneutrons_mass_amount93 - unit21.psnewnewneutrons_mass_amount94])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn4, color = "green")
plt.bar(shell, masn4, color = "lightgray")

fig6n = plt.xlabel(
    'Graph # 15. Shells number \n \n'
    'Delta between the masses of the neutron for the third and fourth phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig6n = plt.ylabel('Weight in kg * 10^-31', fontsize=18)
grid(True)

# Delta between the masses of the neutron for the fourth and first
# phases for the different shells, 2D graph
# The movement of charged particles is taken into account

masn5 = ([unit21.psnewnewneutrons_mass_amount14 - psnewnewneutrons[0].mass,
          unit21.psnewnewneutrons_mass_amount24 - psnewnewneutrons[1].mass,
          unit21.psnewnewneutrons_mass_amount34 - psnewnewneutrons[2].mass,
          unit21.psnewnewneutrons_mass_amount44 - psnewnewneutrons[3].mass,
          unit21.psnewnewneutrons_mass_amount54 - psnewnewneutrons[4].mass,
          unit21.psnewnewneutrons_mass_amount64 - psnewnewneutrons[5].mass,
          unit21.psnewnewneutrons_mass_amount74 - psnewnewneutrons[6].mass,
          unit21.psnewnewneutrons_mass_amount84 - psnewnewneutrons[7].mass,
          unit21.psnewnewneutrons_mass_amount94 - psnewnewneutrons[8].mass])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn5, color = "green")
plt.bar(shell, masn5, color = "lightgray")

fig7n = plt.xlabel(
    'Graph # 16. Shells number \n \n'
    'Delta between the masses of the neutron for the fourth and first phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig7n = plt.ylabel('Weight in kg * 10^-30', fontsize=18)
grid(True)

# The volume of the neutron for the first phases for the different shells, 2D graph

masn11 = ([psnewnewneutrons[0].volume, psnewnewneutrons[1].volume,
           psnewnewneutrons[2].volume,
           psnewnewneutrons[3].volume, psnewnewneutrons[4].volume,
           psnewnewneutrons[5].volume,
           psnewnewneutrons[6].volume, psnewnewneutrons[7].volume,
           psnewnewneutrons[8].volume])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn11, color = "green")
plt.bar(shell, masn11, color = "lightgray")

fig3n1 = plt.xlabel(
    'Graph # 17. Shells number \n \n'
    'The volume of the neutron for the first phases for the different shells \n \n',
    fontsize=18)
fig3n1 = plt.ylabel('Volume in cubic meter * 10^-44', fontsize=18)
grid(True)

# The masses of the new proton for the first phases for the different shells, 2D graph

masp111 = ([newnewprotons[0].mass, newnewprotons[1].mass, newnewprotons[2].mass,
          newnewprotons[3].mass, newnewprotons[4].mass, newnewprotons[5].mass,
         newnewprotons[6].mass, newnewprotons[7].mass, newnewprotons[8].mass])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp111, color = "green")
plt.bar(shell, masp111, color = "lightgray")

fig100 = plt.xlabel(
    'Graph # 18. Shells number \n \n'
    'The masses of the new proton for the first phases for the different shells \n \n',
    fontsize=18)
fig100 = plt.ylabel('Weight in kg * 10^-28', fontsize=18)
grid(True)

# Delta between the masses of the new proton for the first and second phases
# for the different shells, 2D graph
# The movement of charged particles is taken into account, only
masp211 = ([newnewprotons[0].mass - unit19.newnewprotons_mass_amount12,
          newnewprotons[1].mass - unit19.newnewprotons_mass_amount22,
          newnewprotons[2].mass - unit19.newnewprotons_mass_amount32,
          newnewprotons[3].mass - unit19.newnewprotons_mass_amount42,
          newnewprotons[4].mass - unit19.newnewprotons_mass_amount52,
          newnewprotons[5].mass - unit19.newnewprotons_mass_amount62,
          newnewprotons[6].mass - unit19.newnewprotons_mass_amount72,
          newnewprotons[7].mass - unit19.newnewprotons_mass_amount82,
          newnewprotons[8].mass - unit19.newnewprotons_mass_amount92])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masp211, color = "green")
plt.bar(shell, masp211, color = "lightgray")

fig101 = plt.xlabel(
    'Graph # 19. Shells number \n \n'
    'Delta between the masses of the new proton for the first and second phases for \n'
    'the different shells. The movement of charged particles is taken into account, only\n\n',
    fontsize=18)
fig101 = plt.ylabel('Weight in kg * 10^-31', fontsize=18)
grid(True)

# The masses of the new neutron for the first phases for the different shells, 2D graph

masn11 = ([newnewneutrons[0].mass, newnewneutrons[1].mass, newnewneutrons[2].mass,
          newnewneutrons[3].mass, newnewprotons[4].mass, newnewneutrons[5].mass,
         newnewneutrons[6].mass, newnewneutrons[7].mass, newnewneutrons[8].mass])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn11, color = "green")
plt.bar(shell, masn11, color = "lightgray")

fig106 = plt.xlabel(
    'Graph # 20. Shells number \n \n'
    'The masses of the new neutron for the first phases for the different shells \n \n',
    fontsize=18)
fig106 = plt.ylabel('Weight in kg * 10^-28', fontsize=18)
grid(True)

# Delta between the masses of the new neutron for the first and
# second phases for the different shells, 2D graph
# The movement of charged particles is taken into account

masn211 = ([newnewneutrons[0].mass - unit20.newnewneutrons_mass_amount12,
          newnewneutrons[1].mass - unit20.newnewneutrons_mass_amount22,
          newnewneutrons[2].mass - unit20.newnewneutrons_mass_amount32,
          newnewneutrons[3].mass - unit20.newnewneutrons_mass_amount42,
          newnewneutrons[4].mass - unit20.newnewneutrons_mass_amount52,
          newnewneutrons[5].mass - unit20.newnewneutrons_mass_amount62,
          newnewneutrons[6].mass - unit20.newnewneutrons_mass_amount72,
          newnewneutrons[7].mass - unit20.newnewneutrons_mass_amount82,
          newnewneutrons[8].mass - unit20.newnewneutrons_mass_amount92])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn211, color = "green")
plt.bar(shell, masn211, color = "lightgray")

fig107 = plt.xlabel(
    'Graph # 21. Shells number \n \n'
    'Delta between the masses of the new neutron for the first and second phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig107 = plt.ylabel('Weight in kg * 10^-31', fontsize=18)
grid(True)

# Delta between the masses of the new neutron for the second and third phases
# for the different shells, 2D graph
# The movement of charged particles is taken into account

masn31 = ([unit20.newnewneutrons_mass_amount12 - unit20.newnewneutrons_mass_amount13,
          unit20.newnewneutrons_mass_amount22 - unit20.newnewneutrons_mass_amount23,
          unit20.newnewneutrons_mass_amount32 - unit20.newnewneutrons_mass_amount33,
          unit20.newnewneutrons_mass_amount42 - unit20.newnewneutrons_mass_amount43,
          unit20.newnewneutrons_mass_amount52 - unit20.newnewneutrons_mass_amount53,
          unit20.newnewneutrons_mass_amount62 - unit20.newnewneutrons_mass_amount63,
          unit20.newnewneutrons_mass_amount72 - unit20.newnewneutrons_mass_amount73,
          unit20.newnewneutrons_mass_amount82 - unit20.newnewneutrons_mass_amount83,
          unit20.newnewneutrons_mass_amount92 - unit20.newnewneutrons_mass_amount93])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn31, color = "green")
plt.bar(shell, masn31, color = "lightgray")

fig108 = plt.xlabel(
    'Graph # 22. Shells number \n \n'
    'Delta between the masses of the new neutron for the second and third phases for \n'
    'the different shells. The movement of charged particles is taken into account \n',
    fontsize=18)
fig108 = plt.ylabel('Weight in kg * 10^-31', fontsize=18)
grid(True)

# The volume of the new neutron for the first phases for the different shells, 2D graph

masn111 = ([newnewneutrons[0].volume, newnewneutrons[1].volume,
           newnewneutrons[2].volume,
          newnewneutrons[3].volume, newnewneutrons[4].volume,
           newnewneutrons[5].volume,
         newnewneutrons[6].volume, newnewneutrons[7].volume,
           newnewneutrons[8].volume])

shell = ([1, 2, 3, 4, 5, 6, 7, 8, 9])
plt.figure(figsize=(12,8))
plt.plot(shell, masn111, color = "green")
plt.bar(shell, masn111, color = "lightgray")

fig111 = plt.xlabel(
    'Graph # 23. Shells number \n \n'
    'The volume of the new neutron for the first phases for the different shells \n \n',
    fontsize=18)
fig111 = plt.ylabel('Volume in cubic meter * 10^-44', fontsize=18)
grid(True)

# The cycle of charge distribution over shells in a free neutron and proton, 2D graph

x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8])

# neutron free state
y = np.array([psnewnewneutrons[0].charge, psnewnewneutrons[1].charge,
              psnewnewneutrons[2].charge,
              psnewnewneutrons[3].charge, psnewnewneutrons[4].charge,
              psnewnewneutrons[5].charge,
              psnewnewneutrons[6].charge, psnewnewneutrons[7].charge,
              psnewnewneutrons[8].charge])
```

```
# proton free state

z = np.array([psnewnewprotons[0].charge, psnewnewprotons[1].charge,
              psnewnewprotons[2].charge,
              psnewnewprotons[3].charge, psnewnewprotons[4].charge,
              psnewnewprotons[5].charge,
              psnewnewprotons[6].charge, psnewnewprotons[7].charge,
              psnewnewprotons[8].charge])

xx = np.linspace(x.min(),x.max(), 1000)
fig, axs = plt.subplots(1, 1, figsize=(14, 11))

itp1 = PchipInterpolator(x,y)

window_size, poly_order = 57, 2

yy_sg = savgol_filter(itp1(xx), window_size, poly_order)


axs.plot(x, y, 'gs', label= 'The charge distribution in a free neutron over shells')

axs.plot(xx, yy_sg, 'green', label= "Smoothed curve")

itp2 = PchipInterpolator(x,z)

window_size, poly_order = 57, 2

zz_sg = savgol_filter(itp2(xx), window_size, poly_order)


axs.plot(x, z, 'bs', label= 'The charge distribution in a free proton over shells')

axs.plot(xx, zz_sg, 'b', label= "Smoothed curve")

# or fit to a global function
def func(x, A, B, x0, sigma):
    return abs(A)+B*np.tanh((x-x0)/sigma)

fit, _ = curve_fit(func, x, y)
yy_fit = func(xx, *fit)


axs.plot(xx, yy_fit, 'g--', label=r"$f(xn) = |A| + B \tanh\left(\frac{x-x_0}{\sigma}\right)$")

plt.ylabel('The amount of charge \n \n in Cl x E-19', fontsize=15)

plt.xlabel('Shell number', fontsize=15)

yticks(fontsize=12)

plt.title('Graph # 24. THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEUTRON AND PROTON \n',
          fontsize=17)
grid(True)
plt.legend(loc='upper left', fontsize=16)

# The cycle of charge distribution over shells in a free new neutron and new proton, 2D graph

x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8])

# new neutron free state
y22 = np.array([newnewneutrons[0].charge, newnewneutrons[1].charge, newnewneutrons[2].charge,
                newnewneutrons[3].charge, newnewneutrons[4].charge, newnewneutrons[5].charge,
                newnewneutrons[6].charge, newnewneutrons[7].charge, newnewneutrons[8].charge])

# new proton free state
```

```
z22 = np.array([newnewprotons[0].charge, newnewprotons[1].charge,
                newnewprotons[2].charge, newnewprotons[3].charge,
                newnewprotons[4].charge, newnewprotons[5].charge,
                newnewprotons[6].charge, newnewprotons[7].charge,
                newnewprotons[8].charge])

xx = np.linspace(x.min(),x.max(), 1000)
fig, axs = plt.subplots(1, 1, figsize=(14, 11))

itp1 = PchipInterpolator(x,y22)
itp2 = PchipInterpolator(x,z22)
window_size, poly_order = 57, 2

y22y22_sg = savgol_filter(itp1(xx), window_size, poly_order)
z22z22_sg = savgol_filter(itp2(xx), window_size, poly_order)

axs.plot(x, y22, 'gs', label= 'The charge distribution in a free new neutron over shells')

axs.plot(xx, y22y22_sg, 'green', label= "Smoothed curve")

axs.plot(x, z22, 'bs', label= 'The charge distribution in a free new proton over shells')
axs.plot(xx, z22z22_sg, 'b', label= "Smoothed curve")

# or fit to a global function
def func(x, A, B, x0, sigma):
    return abs(A)+B*np.tanh((x-x0)/sigma)

fit, _ = curve_fit(func, x, y22)
y22y22_fit = func(xx, *fit)

fit, _ = curve_fit(func, x, z22)
z22z22_fit = func(xx, *fit)

axs.plot(xx, y22y22_fit, 'g--',
         label=r"$f(xn) = |A| + B \tanh\left(\frac{x-x_0}{\sigma}\right)$")

axs.plot(xx, z22z22_fit, 'b--',
         label=r"$f(xp) = |A| + B \tanh\left(\frac{x-x_0}{\sigma}\right)$")

plt.ylabel('The amount of charge \n \n in Cl x E-20', fontsize=15)

plt.xlabel('Shell number', fontsize=15)

yticks(fontsize=12)

plt.title('Graph # 25. THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEW NEUTRON AND NEW PROTON
\n',
          fontsize=17)
grid(True)
plt.legend(loc='upper left', fontsize=16)

# THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEUTRON
# by phase

x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8])

y22 = np.array([psnewnewneutrons[0].charge, psnewnewneutrons[1].charge,
                psnewnewneutrons[2].charge, psnewnewneutrons[3].charge,
                psnewnewneutrons[4].charge, psnewnewneutrons[5].charge,
                psnewnewneutrons[6].charge, psnewnewneutrons[7].charge,
                psnewnewneutrons[8].charge])

y23 = np.array([unit21.psnewnewneutrons_charge_amount12,
unit21.psnewnewneutrons_charge_amount22,
      unit21.psnewnewneutrons_charge_amount32, unit21.psnewnewneutrons_charge_amount42,
      unit21.psnewnewneutrons_charge_amount52, unit21.psnewnewneutrons_charge_amount62,
      unit21.psnewnewneutrons_charge_amount72, unit21.psnewnewneutrons_charge_amount82,
      unit21.psnewnewneutrons_charge_amount92])

y24 = ([unit21.psnewnewneutrons_charge_amount13,
      unit21.psnewnewneutrons_charge_amount23, unit21.psnewnewneutrons_charge_amount33,
      unit21.psnewnewneutrons_charge_amount43, unit21.psnewnewneutrons_charge_amount53,
      unit21.psnewnewneutrons_charge_amount63, unit21.psnewnewneutrons_charge_amount73,
      unit21.psnewnewneutrons_charge_amount83, unit21.psnewnewneutrons_charge_amount93])

y25 = ([unit21.psnewnewneutrons_charge_amount14, unit21.psnewnewneutrons_charge_amount24,
      unit21.psnewnewneutrons_charge_amount34, unit21.psnewnewneutrons_charge_amount44,
      unit21.psnewnewneutrons_charge_amount54, unit21.psnewnewneutrons_charge_amount64,
      unit21.psnewnewneutrons_charge_amount74, unit21.psnewnewneutrons_charge_amount84,
      unit21.psnewnewneutrons_charge_amount94])


xx = np.linspace(x.min(),x.max(), 1000)
fig, axs = plt.subplots(1, 1, figsize=(14, 11))

itp1 = PchipInterpolator(x,y22)

window_size, poly_order = 57, 2

y22y22_sg = savgol_filter(itp1(xx), window_size, poly_order)

axs.plot(x, y22, 'gs', label = 'phase 1')

axs.plot(xx, y22y22_sg, 'green', label = "Smoothed curve")


itp2 = PchipInterpolator(x,y23)


y23y23_sg = savgol_filter(itp2(xx), window_size, poly_order)


axs.plot(x, y23, 'ks', label = 'phase 2')

axs.plot(xx, y23y23_sg, 'k', label = "Smoothed curve")


itp3 = PchipInterpolator(x,y24)

y24y24_sg = savgol_filter(itp3(xx), window_size, poly_order)


axs.plot(x, y24, 'bs', label = 'phase 3')

axs.plot(xx, y24y24_sg, 'blue', label = "Smoothed curve")


itp4 = PchipInterpolator(x,y25)


y25y25_sg = savgol_filter(itp4(xx), window_size, poly_order)


axs.plot(x, y25, 'ys', label = 'phase 4')

axs.plot(xx, y25y25_sg, 'y', label = "Smoothed curve")


plt.ylabel('The amount of charge \n \n in Cl x E-19', fontsize=15)
plt.xlabel('Shell number', fontsize=15)

yticks(fontsize=12)

plt.title('Graph # 26. THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEUTRON \n',
          fontsize=17)
grid(True)

plt.legend(loc='upper left', fontsize=16)

# Possible variant of the distribution of the electric charge
# of a neutron over the shells for the entire cycle

x = ([psnewnewneutrons[0].charge, psnewnewneutrons[1].charge,
      psnewnewneutrons[2].charge, psnewnewneutrons[3].charge,
      psnewnewneutrons[4].charge, psnewnewneutrons[5].charge,
      psnewnewneutrons[6].charge, psnewnewneutrons[7].charge,
      psnewnewneutrons[8].charge,
      unit21.psnewnewneutrons_charge_amount12, unit21.psnewnewneutrons_charge_amount22,
      unit21.psnewnewneutrons_charge_amount32, unit21.psnewnewneutrons_charge_amount42,
      unit21.psnewnewneutrons_charge_amount52, unit21.psnewnewneutrons_charge_amount62,
      unit21.psnewnewneutrons_charge_amount72, unit21.psnewnewneutrons_charge_amount82,
      unit21.psnewnewneutrons_charge_amount92, unit21.psnewnewneutrons_charge_amount13,
      unit21.psnewnewneutrons_charge_amount23, unit21.psnewnewneutrons_charge_amount33,
      unit21.psnewnewneutrons_charge_amount43, unit21.psnewnewneutrons_charge_amount53,
      unit21.psnewnewneutrons_charge_amount63, unit21.psnewnewneutrons_charge_amount73,
      unit21.psnewnewneutrons_charge_amount83, unit21.psnewnewneutrons_charge_amount93,
      unit21.psnewnewneutrons_charge_amount14, unit21.psnewnewneutrons_charge_amount24,
      unit21.psnewnewneutrons_charge_amount34, unit21.psnewnewneutrons_charge_amount44,
      unit21.psnewnewneutrons_charge_amount54, unit21.psnewnewneutrons_charge_amount64,
      unit21.psnewnewneutrons_charge_amount74, unit21.psnewnewneutrons_charge_amount84,
      unit21.psnewnewneutrons_charge_amount94])

y = ([1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4,
      5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9])

xs, ys = np.meshgrid(x, y)

zs = sin(xs + ys)

fig = plt.figure(figsize=(6,6))

ax = Axes3D(fig)
surf = ax.plot_surface(xs, ys, zs, rstride=1, cstride=1, cmap='Set1')
fig.colorbar(surf, shrink=0.5, aspect=5)
ax.text2D(0.2, 0.95,
          "Graph # 27. Possible variant of the distribution of the electric \n"
          "charge of a neutron over the shells for the entire cycle \n",
          transform=ax.transAxes, fontsize = 16)

plt.show()

# THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE PROTON
# by phase

x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8])

y22 = np.array([psnewnewprotons[0].charge, psnewnewprotons[1].charge,
                psnewnewprotons[2].charge, psnewnewprotons[3].charge,
                psnewnewprotons[4].charge, psnewnewprotons[5].charge,
                psnewnewprotons[6].charge, psnewnewprotons[7].charge,
                psnewnewprotons[8].charge])

y23 = np.array([unit22.psnewnewprotons_charge_amount12, unit22.psnewnewprotons_charge_amount22,
      unit22.psnewnewprotons_charge_amount32, unit22.psnewnewprotons_charge_amount42,
      unit22.psnewnewprotons_charge_amount52, unit22.psnewnewprotons_charge_amount62,
      unit22.psnewnewprotons_charge_amount72, unit22.psnewnewprotons_charge_amount82,
      unit22.psnewnewprotons_charge_amount92])

y24 = ([unit22.psnewnewprotons_charge_amount13,
      unit22.psnewnewprotons_charge_amount23, unit22.psnewnewprotons_charge_amount33,
      unit22.psnewnewprotons_charge_amount43, unit22.psnewnewprotons_charge_amount53,
      unit22.psnewnewprotons_charge_amount63, unit22.psnewnewprotons_charge_amount73,
      unit22.psnewnewprotons_charge_amount83, unit22.psnewnewprotons_charge_amount93])

y25 = ([unit22.psnewnewprotons_charge_amount14, unit22.psnewnewprotons_charge_amount24,
      unit22.psnewnewprotons_charge_amount34, unit22.psnewnewprotons_charge_amount44,
      unit22.psnewnewprotons_charge_amount54, unit22.psnewnewprotons_charge_amount64,
      unit22.psnewnewprotons_charge_amount74, unit22.psnewnewprotons_charge_amount84,
      unit22.psnewnewprotons_charge_amount94])


xx = np.linspace(x.min(),x.max(), 1000)
fig, axs = plt.subplots(1, 1, figsize=(14, 11))

itp1 = PchipInterpolator(x,y22)

window_size, poly_order = 57, 2

y22y22_sg = savgol_filter(itp1(xx), window_size, poly_order)

axs.plot(x, y22, 'gs', label = 'phase 1')

axs.plot(xx, y22y22_sg, 'green', label = "Smoothed curve")


itp2 = PchipInterpolator(x,y23)


y23y23_sg = savgol_filter(itp2(xx), window_size, poly_order)


axs.plot(x, y23, 'ks', label = 'phase 2')

axs.plot(xx, y23y23_sg, 'k', label = "Smoothed curve")


itp3 = PchipInterpolator(x,y24)

y24y24_sg = savgol_filter(itp3(xx), window_size, poly_order)


axs.plot(x, y24, 'bs', label = 'phase 3')

axs.plot(xx, y24y24_sg, 'blue', label = "Smoothed curve")


itp4 = PchipInterpolator(x,y25)


y25y25_sg = savgol_filter(itp4(xx), window_size, poly_order)


axs.plot(x, y25, 'ys', label = 'phase 4')

axs.plot(xx, y25y25_sg, 'y', label = "Smoothed curve")


plt.ylabel('The amount of charge \n \n in Cl x E-19', fontsize=15)
plt.xlabel('Shell number', fontsize=15)

yticks(fontsize=12)

plt.title('Graph # 28. THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE PROTON\n',
          fontsize=17)
grid(True)

plt.legend(loc='upper left', fontsize=16)

# Possible variant of the distribution of the electric charge
# of a proton over the shells for the entire cycle

x = ([psnewnewprotons[0].charge, psnewnewprotons[1].charge,
      psnewnewprotons[2].charge, psnewnewprotons[3].charge,
      psnewnewprotons[4].charge, psnewnewprotons[5].charge,
      psnewnewprotons[6].charge, psnewnewprotons[7].charge,
      psnewnewprotons[8].charge,
      unit22.psnewnewprotons_charge_amount12, unit22.psnewnewprotons_charge_amount22,
      unit22.psnewnewprotons_charge_amount32, unit22.psnewnewprotons_charge_amount42,
      unit22.psnewnewprotons_charge_amount52, unit22.psnewnewprotons_charge_amount62,
      unit22.psnewnewprotons_charge_amount72, unit22.psnewnewprotons_charge_amount82,
      unit22.psnewnewprotons_charge_amount92, unit22.psnewnewprotons_charge_amount13,
      unit22.psnewnewprotons_charge_amount23, unit22.psnewnewprotons_charge_amount33,
      unit22.psnewnewprotons_charge_amount43, unit22.psnewnewprotons_charge_amount53,
      unit22.psnewnewprotons_charge_amount63, unit22.psnewnewprotons_charge_amount73,
      unit22.psnewnewprotons_charge_amount83, unit22.psnewnewprotons_charge_amount93,
      unit22.psnewnewprotons_charge_amount14, unit22.psnewnewprotons_charge_amount24,
      unit22.psnewnewprotons_charge_amount34, unit22.psnewnewprotons_charge_amount44,
      unit22.psnewnewprotons_charge_amount54, unit22.psnewnewprotons_charge_amount64,
      unit22.psnewnewprotons_charge_amount74, unit22.psnewnewprotons_charge_amount84,
      unit22.psnewnewprotons_charge_amount94])

y = ([1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4,
      5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9])

xs, ys = np.meshgrid(x, y)

zs = sin(xs + ys)

fig = plt.figure(figsize=(6,6))

ax = Axes3D(fig)
surf = ax.plot_surface(xs, ys, zs, rstride=1, cstride=1, cmap='Set1')
fig.colorbar(surf, shrink=0.5, aspect=5)
ax.text2D(0.2, 0.95,
          "Graph # 29. Possible variant of the distribution of the\n"
          "electric charge of a proton over the shells for the entire cycle \n",
          transform=ax.transAxes, fontsize = 16)

plt.show()

# THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEW PROTON
# by phase

x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8])

y22 = np.array([newnewprotons[0].charge, newnewprotons[1].charge,
      newnewprotons[2].charge, newnewprotons[3].charge,
      newnewprotons[4].charge, newnewprotons[5].charge,
      newnewprotons[6].charge, newnewprotons[7].charge,
      newnewprotons[8].charge])

y23 = np.array([unit19.newnewprotons_charge_amount12, unit19.newnewprotons_charge_amount22,
      unit19.newnewprotons_charge_amount32, unit19.newnewprotons_charge_amount42,
      unit19.newnewprotons_charge_amount52, unit19.newnewprotons_charge_amount62,
      unit19.newnewprotons_charge_amount72, unit19.newnewprotons_charge_amount82,
      unit19.newnewprotons_charge_amount92])

y24 = ([unit19.newnewprotons_charge_amount13,
      unit19.newnewprotons_charge_amount23, unit19.newnewprotons_charge_amount33,
      unit19.newnewprotons_charge_amount43, unit19.newnewprotons_charge_amount53,
      unit19.newnewprotons_charge_amount63, unit19.newnewprotons_charge_amount73,
      unit19.newnewprotons_charge_amount83, unit19.newnewprotons_charge_amount93])

y25 = ([unit19.newnewprotons_charge_amount14, unit19.newnewprotons_charge_amount24,
      unit19.newnewprotons_charge_amount34, unit19.newnewprotons_charge_amount44,
      unit19.newnewprotons_charge_amount54, unit19.newnewprotons_charge_amount64,
      unit19.newnewprotons_charge_amount74, unit19.newnewprotons_charge_amount84,
      unit19.newnewprotons_charge_amount94])


xx = np.linspace(x.min(),x.max(), 1000)
fig, axs = plt.subplots(1, 1, figsize=(14, 11))

itp1 = PchipInterpolator(x,y22)

window_size, poly_order = 57, 2

y22y22_sg = savgol_filter(itp1(xx), window_size, poly_order)

axs.plot(x, y22, 'gs', label = 'phase 1')

axs.plot(xx, y22y22_sg, 'green', label = "Smoothed curve")


itp2 = PchipInterpolator(x,y23)


y23y23_sg = savgol_filter(itp2(xx), window_size, poly_order)


axs.plot(x, y23, 'ks', label = 'phase 2')

axs.plot(xx, y23y23_sg, 'k', label = "Smoothed curve")


itp3 = PchipInterpolator(x,y24)

y24y24_sg = savgol_filter(itp3(xx), window_size, poly_order)


axs.plot(x, y24, 'bs', label = 'phase 3')

axs.plot(xx, y24y24_sg, 'blue', label = "Smoothed curve")


itp4 = PchipInterpolator(x,y25)


y25y25_sg = savgol_filter(itp4(xx), window_size, poly_order)


axs.plot(x, y25, 'ys', label = 'phase 4')

axs.plot(xx, y25y25_sg, 'y', label = "Smoothed curve")


plt.ylabel('The amount of charge \n \n in Cl x E-20', fontsize=15)
plt.xlabel('Shell number', fontsize=15)

yticks(fontsize=12)

plt.title('Graph # 30. THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEW PROTON\n',
          fontsize=17)
grid(True)

plt.legend(loc='upper left', fontsize=16)

# Possible variant of the distribution of the electric charge
# of a new proton over the shells for the entire cycle

x = ([newnewprotons[0].charge, newnewprotons[1].charge,
      newnewprotons[2].charge, newnewprotons[3].charge,
      newnewprotons[4].charge, newnewprotons[5].charge,
      newnewprotons[6].charge, newnewprotons[7].charge,
      newnewprotons[8].charge,
      unit19.newnewprotons_charge_amount12, unit19.newnewprotons_charge_amount22,
      unit19.newnewprotons_charge_amount32, unit19.newnewprotons_charge_amount42,
      unit19.newnewprotons_charge_amount52, unit19.newnewprotons_charge_amount62,
      unit19.newnewprotons_charge_amount72, unit19.newnewprotons_charge_amount82,
      unit19.newnewprotons_charge_amount92, unit19.newnewprotons_charge_amount13,
      unit19.newnewprotons_charge_amount23, unit19.newnewprotons_charge_amount33,
      unit19.newnewprotons_charge_amount43, unit19.newnewprotons_charge_amount53,
      unit19.newnewprotons_charge_amount63, unit19.newnewprotons_charge_amount73,
      unit19.newnewprotons_charge_amount83, unit19.newnewprotons_charge_amount93,
      unit19.newnewprotons_charge_amount14, unit19.newnewprotons_charge_amount24,
      unit19.newnewprotons_charge_amount34, unit19.newnewprotons_charge_amount44,
      unit19.newnewprotons_charge_amount54, unit19.newnewprotons_charge_amount64,
      unit19.newnewprotons_charge_amount74, unit19.newnewprotons_charge_amount84,
      unit19.newnewprotons_charge_amount94])

y = ([1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4,
      5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9])

xs, ys = np.meshgrid(x, y)

zs = sin(xs + ys)

fig = plt.figure(figsize=(6,6))

ax = Axes3D(fig)
surf = ax.plot_surface(xs, ys, zs, rstride=1, cstride=1, cmap='Set1')
fig.colorbar(surf, shrink=0.5, aspect=5)
ax.text2D(0.2, 0.95,
          "Graph # 31. Possible variant of the distribution of the\n"
          "electric charge of a new proton over the shells for the entire cycle \n",
          transform=ax.transAxes, fontsize = 16)

plt.show()

# THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEW NEUTRON
# by phase

x = np.array([0, 1, 2, 3, 4, 5, 6, 7, 8])

y22 = np.array([newnewneutrons[0].charge, newnewneutrons[1].charge,
      newnewneutrons[2].charge, newnewneutrons[3].charge,
      newnewneutrons[4].charge, newnewneutrons[5].charge,
      newnewneutrons[6].charge, newnewneutrons[7].charge,
      newnewneutrons[8].charge])

y23 = np.array([unit20.newnewneutrons_charge_amount12, unit20.newnewneutrons_charge_amount22,
      unit20.newnewneutrons_charge_amount32, unit20.newnewneutrons_charge_amount42,
      unit20.newnewneutrons_charge_amount52, unit20.newnewneutrons_charge_amount62,
      unit20.newnewneutrons_charge_amount72, unit20.newnewneutrons_charge_amount82,
      unit20.newnewneutrons_charge_amount92])

y24 = ([unit20.newnewneutrons_charge_amount13,
      unit20.newnewneutrons_charge_amount23, unit20.newnewneutrons_charge_amount33,
      unit20.newnewneutrons_charge_amount43, unit20.newnewneutrons_charge_amount53,
      unit20.newnewneutrons_charge_amount63, unit20.newnewneutrons_charge_amount73,
      unit20.newnewneutrons_charge_amount83, unit20.newnewneutrons_charge_amount93])

y25 = ([unit20.newnewneutrons_charge_amount14, unit20.newnewneutrons_charge_amount24,
      unit20.newnewneutrons_charge_amount34, unit20.newnewneutrons_charge_amount44,
      unit20.newnewneutrons_charge_amount54, unit20.newnewneutrons_charge_amount64,
      unit20.newnewneutrons_charge_amount74, unit20.newnewneutrons_charge_amount84,
      unit20.newnewneutrons_charge_amount94])

y26 = ([unit20.newnewneutrons_charge_amount15, unit20.newnewneutrons_charge_amount25,
      unit20.newnewneutrons_charge_amount35, unit20.newnewneutrons_charge_amount45,
      unit20.newnewneutrons_charge_amount55, unit20.newnewneutrons_charge_amount65,
      unit20.newnewneutrons_charge_amount75, unit20.newnewneutrons_charge_amount85,
      unit20.newnewneutrons_charge_amount95])


xx = np.linspace(x.min(),x.max(), 1000)
fig, axs = plt.subplots(1, 1, figsize=(14, 11))

itp1 = PchipInterpolator(x,y22)

window_size, poly_order = 57, 2

y22y22_sg = savgol_filter(itp1(xx), window_size, poly_order)

axs.plot(x, y22, 'gs', label = 'phase 1')

axs.plot(xx, y22y22_sg, 'green', label = "Smoothed curve")


itp2 = PchipInterpolator(x,y23)


y23y23_sg = savgol_filter(itp2(xx), window_size, poly_order)


axs.plot(x, y23, 'ks', label = 'phase 2')

axs.plot(xx, y23y23_sg, 'k', label = "Smoothed curve")


itp3 = PchipInterpolator(x,y24)

y24y24_sg = savgol_filter(itp3(xx), window_size, poly_order)


axs.plot(x, y24, 'bs', label = 'phase 3')

axs.plot(xx, y24y24_sg, 'blue', label = "Smoothed curve")


itp4 = PchipInterpolator(x,y25)

y25y25_sg = savgol_filter(itp4(xx), window_size, poly_order)


axs.plot(x, y25, 'ys', label = 'phase 4')
axs.plot(xx, y25y25_sg, 'y', label = "Smoothed curve")

itp5 = PchipInterpolator(x,y26)

y26y26_sg = savgol_filter(itp5(xx), window_size, poly_order)


axs.plot(x, y26, 'rs', label = 'phase 5')

axs.plot(xx, y26y26_sg, 'r', label = "Smoothed curve")


plt.ylabel('The amount of charge \n \n in Cl x E-20', fontsize=15)

plt.xlabel('Shell number', fontsize=15)

yticks(fontsize=12)

plt.title('Graph # 32 THE CHARGE DISTRIBUTION OVER SHELLS IN A FREE NEW NEUTRON \n',
          fontsize=17)
grid(True)

plt.legend(loc='upper left', fontsize=16)

# Possible variant of the distribution of the electric charge
# of a new neutron over the shells for the entire cycle

x = ([newnewneutrons[0].charge, newnewneutrons[1].charge,
      newnewneutrons[2].charge, newnewneutrons[3].charge,
      newnewneutrons[4].charge, newnewneutrons[5].charge,
      newnewneutrons[6].charge, newnewneutrons[7].charge,
      newnewneutrons[8].charge,
      unit20.newnewneutrons_charge_amount12, unit20.newnewneutrons_charge_amount22,
      unit20.newnewneutrons_charge_amount32, unit20.newnewneutrons_charge_amount42,
      unit20.newnewneutrons_charge_amount52, unit20.newnewneutrons_charge_amount62,
      unit20.newnewneutrons_charge_amount72, unit20.newnewneutrons_charge_amount82,
      unit20.newnewneutrons_charge_amount92, unit20.newnewneutrons_charge_amount13,
      unit20.newnewneutrons_charge_amount23, unit20.newnewneutrons_charge_amount33,
      unit20.newnewneutrons_charge_amount43, unit20.newnewneutrons_charge_amount53,
      unit20.newnewneutrons_charge_amount63, unit20.newnewneutrons_charge_amount73,
      unit20.newnewneutrons_charge_amount83, unit20.newnewneutrons_charge_amount93,
      unit20.newnewneutrons_charge_amount14, unit20.newnewneutrons_charge_amount24,
      unit20.newnewneutrons_charge_amount34, unit20.newnewneutrons_charge_amount44,
      unit20.newnewneutrons_charge_amount54, unit20.newnewneutrons_charge_amount64,
      unit20.newnewneutrons_charge_amount74, unit20.newnewneutrons_charge_amount84,
      unit20.newnewneutrons_charge_amount94, unit20.newnewneutrons_charge_amount15,
      unit20.newnewneutrons_charge_amount25,
      unit20.newnewneutrons_charge_amount35, unit20.newnewneutrons_charge_amount45,
      unit20.newnewneutrons_charge_amount55, unit20.newnewneutrons_charge_amount65,
      unit20.newnewneutrons_charge_amount75, unit20.newnewneutrons_charge_amount85,
      unit20.newnewneutrons_charge_amount95])

y = ([1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4,
      5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9, 1, 2, 3, 4, 5, 6, 7, 8, 9])

xs, ys = np.meshgrid(x, y)

zs = sin(xs + ys)

fig = plt.figure(figsize=(6,6))

ax = Axes3D(fig)
surf = ax.plot_surface(xs, ys, zs, rstride=1, cstride=1, cmap='Set1')
fig.colorbar(surf, shrink=0.5, aspect=5)
ax.text2D(0.2, 0.95,
          "Graph # 33 Possible variant of the distribution of the electric \n"
          "charge of a neutron over the shells for the entire cycle \n",
          transform=ax.transAxes, fontsize = 16)

plt.show()

# Interrelation of mass, volume, charge within a newproton, 3D graph

fig = plt.figure(figsize=plt.figaspect(0.3))

ax = fig.add_subplot(1, 2, 1, projection='3d')

Xpp = ([newnewprotons[0].charge, newnewprotons[1].charge,
        newnewprotons[2].charge, newnewprotons[3].charge,
        newnewprotons[4].charge, newnewprotons[5].charge,
        newnewprotons[6].charge, newnewprotons[7].charge,
        newnewprotons[8].charge])
Ypp = ([newnewprotons[0].volume, newnewprotons[1].volume,
        newnewprotons[2].volume, newnewprotons[3].volume,
        newnewprotons[4].volume, newnewprotons[5].volume,
        newnewprotons[6].volume, newnewprotons[7].volume,
        newnewprotons[8].volume])
Zpp = ([newnewprotons[0].mass, newnewprotons[1].mass,
        newnewprotons[2].mass, newnewprotons[3].mass,
        newnewprotons[4].mass, newnewprotons[5].mass,
        newnewprotons[6].mass, newnewprotons[7].mass,
        newnewprotons[8].mass])

ax.plot(Xpp,Ypp,Zpp)

ax.set_xlabel('\n \n \n The quantity charge shell \n in Cl x E-20', fontsize = 15)
ax.set_zlabel('\n \n \n Mass in \n kg. x E-28', fontsize = 15)
ax.set_ylabel('\n \n \n Shell volume in\n cbm*E-44', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 34. Interrelation of mass, volume, \n"
          "charge within a new proton",
          transform=ax.transAxes, fontsize = 16)


# Interrelation of mass, volume, charge within a newneutron, 3D graph

ax = fig.add_subplot(1, 2, 2, projection='3d')

Xnn = ([newnewneutrons[0].charge, newnewneutrons[1].charge,
        newnewneutrons[2].charge, newnewneutrons[3].charge,
        newnewneutrons[4].charge, newnewneutrons[5].charge,
        newnewneutrons[6].charge, newnewneutrons[7].charge,
        newnewneutrons[8].charge])
Ynn = ([newnewneutrons[0].volume, newnewneutrons[1].volume,
        newnewneutrons[2].volume, newnewneutrons[3].volume,
        newnewneutrons[4].volume, newnewneutrons[5].volume,
        newnewneutrons[6].volume, newnewneutrons[7].volume,
        newnewneutrons[8].volume])
Znn = ([newnewneutrons[0].mass, newnewneutrons[1].mass,
        newnewneutrons[2].mass, newnewneutrons[3].mass,
        newnewneutrons[4].mass, newnewneutrons[5].mass,
        newnewneutrons[6].mass, newnewneutrons[7].mass,
        newnewneutrons[8].mass])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n The quantity charge shell \n in Cl x E-20', fontsize = 15)
ax.set_zlabel('\n \n \n Mass in \n kg. x E-28', fontsize = 15)
ax.set_ylabel('\n \n \n Shell volume in\n cbm*E-44', fontsize = 15)
ax.text2D(0.2, 0.95,
          "Graph # 35. Interrelation of mass, volume, \n"
          "charge within a new neutron",
          transform=ax.transAxes, fontsize = 16)

# Interrelation of mass, volume, charge within a proton, 3D graph

fig = plt.figure(figsize=plt.figaspect(0.3))

ax = fig.add_subplot(1, 2, 1, projection='3d')

Xpp = ([psnewnewprotons[0].charge, psnewnewprotons[1].charge,
        psnewnewprotons[2].charge, psnewnewprotons[3].charge,
        psnewnewprotons[4].charge, psnewnewprotons[5].charge,
        psnewnewprotons[6].charge, psnewnewprotons[7].charge,
        psnewnewprotons[8].charge])
Ypp = ([psnewnewprotons[0].volume, psnewnewprotons[1].volume,
        psnewnewprotons[2].volume, psnewnewprotons[3].volume,
        psnewnewprotons[4].volume, psnewnewprotons[5].volume,
        psnewnewprotons[6].volume, psnewnewprotons[7].volume,
        psnewnewprotons[8].volume])
Zpp = ([psnewnewprotons[0].mass, psnewnewprotons[1].mass,
        psnewnewprotons[2].mass, psnewnewprotons[3].mass,
        psnewnewprotons[4].mass, psnewnewprotons[5].mass,
        psnewnewprotons[6].mass, psnewnewprotons[7].mass,
        psnewnewprotons[8].mass])

ax.plot(Xpp,Ypp,Zpp)
ax.set_xlabel('\n \n \n The quantity charge shell \n in Cl x E-19', fontsize = 15)
ax.set_zlabel('\n \n \n Mass in \n kg. x E-28', fontsize = 15)
ax.set_ylabel('\n \n \n Shell volume in\n cbm*E-44', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 36. Interrelation of mass, volume, \n"
          "charge within a proton",
          transform=ax.transAxes, fontsize = 16)

# Interrelation of mass, volume, charge within a neutron, 3D graph

ax = fig.add_subplot(1, 2, 2, projection='3d')

Xnn = ([psnewnewneutrons[0].charge, psnewnewneutrons[1].charge,
        psnewnewneutrons[2].charge, psnewnewneutrons[3].charge,
        psnewnewneutrons[4].charge, psnewnewneutrons[5].charge,
        psnewnewneutrons[6].charge, psnewnewneutrons[7].charge,
        psnewnewneutrons[8].charge])
Ynn = ([psnewnewneutrons[0].volume, psnewnewneutrons[1].volume,
        psnewnewneutrons[2].volume, psnewnewneutrons[3].volume,
        psnewnewneutrons[4].volume, psnewnewneutrons[5].volume,
        psnewnewneutrons[6].volume, psnewnewneutrons[7].volume,
        psnewnewneutrons[8].volume])
Znn = ([psnewnewneutrons[0].mass, psnewnewneutrons[1].mass,
        psnewnewneutrons[2].mass, psnewnewneutrons[3].mass,
        psnewnewneutrons[4].mass, psnewnewneutrons[5].mass,
        psnewnewneutrons[6].mass, psnewnewneutrons[7].mass,
        psnewnewneutrons[8].mass])

ax.plot(Xnn,Ynn,Znn)
ax.set_xlabel('\n \n \n The quantity charge shell \n in Cl x E-19', fontsize = 15)
ax.set_zlabel('\n \n \n Mass in \n kg. x E-28', fontsize = 15)
ax.set_ylabel('\n \n \n Shell volume in\n cbm*E-44', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 37. Interrelation of mass, volume, \n"
          "charge within a neutron",
          transform=ax.transAxes, fontsize = 16)

# The relationship of wavelength, gravity and
# electromagnetism in a new neutron, 3D graph
fig = plt.figure(figsize=plt.figaspect(0.3))

ax = fig.add_subplot(1, 2, 1, projection='3d')

Xnn = ([unit3.newcomptonln[0], unit3.newcomptonln[1],
        unit3.newcomptonln[2], unit3.newcomptonln[3],
        unit3.newcomptonln[4], unit3.newcomptonln[5],
        unit3.newcomptonln[6], unit3.newcomptonln[7],
        unit3.newcomptonln[8]])
Ynn = ([unit7.newelektromagnetikn[0], unit7.newelektromagnetikn[1],
        unit7.newelektromagnetikn[2],
        unit7.newelektromagnetikn[3], unit7.newelektromagnetikn[4],
        unit7.newelektromagnetikn[5],
        unit7.newelektromagnetikn[6], unit7.newelektromagnetikn[7],
        unit7.newelektromagnetikn[8]])
Znn = ([unit11.newgravn[0], unit11.newgravn[1], unit11.newgravn[2],
        unit11.newgravn[3], unit11.newgravn[4],
        unit11.newgravn[5], unit11.newgravn[6], unit11.newgravn[7],
        unit11.newgravn[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Compton wavelength \n ', fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 38. The relationship of wavelength,\n"
          "gravity and electromagnetism in a new neutron",
          transform=ax.transAxes, fontsize = 16)

# The relationship of wavelength, gravity and electromagnetism
# in a new proton, 3D graf

ax = fig.add_subplot(1, 2, 2, projection='3d')

Xnn = ([unit2.newcomptonlp[0], unit2.newcomptonlp[1],
        unit2.newcomptonlp[2], unit2.newcomptonlp[3],
        unit2.newcomptonlp[4], unit2.newcomptonlp[5],
        unit2.newcomptonlp[6], unit2.newcomptonlp[7],
        unit2.newcomptonlp[8]])
Ynn = ([unit6.newelektromagnetikp[0], unit6.newelektromagnetikp[1],
        unit6.newelektromagnetikp[2],
        unit6.newelektromagnetikp[3], unit6.newelektromagnetikp[4],
        unit6.newelektromagnetikp[5],
        unit6.newelektromagnetikp[6], unit6.newelektromagnetikp[7],
        unit6.newelektromagnetikp[8]])
Znn = ([unit10.newgravp[0], unit10.newgravp[1], unit10.newgravp[2],
        unit10.newgravp[3], unit10.newgravp[4],
        unit10.newgravp[5], unit10.newgravp[6], unit10.newgravp[7],
        unit10.newgravp[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Compton wavelength \n ', fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 39. The relationship of wavelength,\n "
          "gravity and electromagnetism in a new proton",
          transform=ax.transAxes, fontsize = 16)

# Interrelation of frequency, gravity and electromagnetism in new neutron, 3D graf

fig = plt.figure(figsize=plt.figaspect(0.3))

ax = fig.add_subplot(1, 2, 1, projection='3d')

Xnn = ([unit15.newfrequencen[0], unit15.newfrequencen[1], unit15.newfrequencen[2],
        unit15.newfrequencen[3], unit15.newfrequencen[4], unit15.newfrequencen[5],
        unit15.newfrequencen[6], unit15.newfrequencen[7], unit15.newfrequencen[8]])
Ynn = ([unit7.newelektromagnetikn[0], unit7.newelektromagnetikn[1],
        unit7.newelektromagnetikn[2],
        unit7.newelektromagnetikn[3], unit7.newelektromagnetikn[4],
        unit7.newelektromagnetikn[5],
        unit7.newelektromagnetikn[6], unit7.newelektromagnetikn[7],
        unit7.newelektromagnetikn[8]])
Znn = ([unit11.newgravn[0], unit11.newgravn[1], unit11.newgravn[2],
        unit11.newgravn[3],
        unit11.newgravn[4], unit11.newgravn[5], unit11.newgravn[6],
        unit11.newgravn[7], unit11.newgravn[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Frequency \n taking into account \n'
              'speed of light \n and Compton wavelength',
              fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 40. Interrelation of frequency,\n "
          "gravity and \n electromagnetism in new neutron\n",
          transform=ax.transAxes, fontsize = 16)

# Interrelation of frequency, gravity and electromagnetism in new proton, 3D graf

ax = fig.add_subplot(1, 2, 2, projection='3d')

Xnn = ([unit14.newfrequencep[0], unit14.newfrequencep[1], unit14.newfrequencep[2],
        unit14.newfrequencep[3], unit14.newfrequencep[4], unit14.newfrequencep[5],
        unit14.newfrequencep[6], unit14.newfrequencep[7], unit14.newfrequencep[8]])
Ynn = ([unit6.newelektromagnetikp[0], unit6.newelektromagnetikp[1],
        unit6.newelektromagnetikp[2], unit6.newelektromagnetikp[3],
        unit6.newelektromagnetikp[4], unit6.newelektromagnetikp[5],
        unit6.newelektromagnetikp[6], unit6.newelektromagnetikp[7],
        unit6.newelektromagnetikp[8]])
Znn = ([unit10.newgravp[0], unit10.newgravp[1], unit10.newgravp[2], unit10.newgravp[3],
        unit10.newgravp[4], unit10.newgravp[5], unit10.newgravp[6], unit10.newgravp[7],
        unit10.newgravp[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Frequency \n taking into account \n'
              'speed of light \n and Compton wavelength \n ',
              fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 41. Interrelation of frequency, gravity \n "
          "and electromagnetism in new proton",
          transform=ax.transAxes, fontsize = 16)
```

```
# The relationship of wavelength, gravity and electromagnetism in a pseudo new neutron

fig = plt.figure(figsize=plt.figaspect(0.3))

ax = fig.add_subplot(1, 2, 1, projection='3d')

Xnn = ([unit4.newcomptonlpsn[0], unit4.newcomptonlpsn[1], unit4.newcomptonlpsn[2],
        unit4.newcomptonlpsn[3], unit4.newcomptonlpsn[4], unit4.newcomptonlpsn[5],
        unit4.newcomptonlpsn[6], unit4.newcomptonlpsn[7], unit4.newcomptonlpsn[8]])
Ynn = ([unit8.newelektromagnetikpsn[0], unit8.newelektromagnetikpsn[1],
        unit8.newelektromagnetikpsn[2], unit8.newelektromagnetikpsn[3],
        unit8.newelektromagnetikpsn[4], unit8.newelektromagnetikpsn[5],
        unit8.newelektromagnetikpsn[6], unit8.newelektromagnetikpsn[7],
        unit8.newelektromagnetikpsn[8]])
Znn = ([unit12.newgravpsn[0], unit12.newgravpsn[1], unit12.newgravpsn[2],
        unit12.newgravpsn[3], unit12.newgravpsn[4], unit12.newgravpsn[5],
        unit12.newgravpsn[6], unit12.newgravpsn[7], unit12.newgravpsn[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Compton wavelength \n ', fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 42. The relationship of wavelength,\n"
          "gravity and electromagnetism in a pseudo new neutron",
          transform=ax.transAxes, fontsize = 16)

# The relationship of wavelength, gravity and
# electromagnetism in a pseudo new proton, 3D graf

ax = fig.add_subplot(1, 2, 2, projection='3d')

Xnn = ([unit5.newcomptonlpsp[0], unit5.newcomptonlpsp[1], unit5.newcomptonlpsp[2],
        unit5.newcomptonlpsp[3], unit5.newcomptonlpsp[4], unit5.newcomptonlpsp[5],
        unit5.newcomptonlpsp[6], unit5.newcomptonlpsp[7], unit5.newcomptonlpsp[8]])
Ynn = ([unit9.newelektromagnetikpsp[0], unit9.newelektromagnetikpsp[1],
        unit9.newelektromagnetikpsp[2], unit9.newelektromagnetikpsp[3],
        unit9.newelektromagnetikpsp[4], unit9.newelektromagnetikpsp[5],
        unit9.newelektromagnetikpsp[6], unit9.newelektromagnetikpsp[7],
        unit9.newelektromagnetikpsp[8]])
Znn = ([unit13.newgravpsp[0], unit13.newgravpsp[1], unit13.newgravpsp[2],
        unit13.newgravpsp[3], unit13.newgravpsp[4], unit13.newgravpsp[5],
        unit13.newgravpsp[6], unit13.newgravpsp[7], unit13.newgravpsp[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Compton wavelength \n ', fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95, "Graph # 43. The relationship of\n "
          "wavelength, gravity and electromagnetism in a proton",
          transform=ax.transAxes, fontsize = 16)

# Interrelation of frequency, gravity and electromagnetism in pseudo new neutron, 3D graf

fig = plt.figure(figsize=plt.figaspect(0.3))

ax = fig.add_subplot(1, 2, 1, projection='3d')

Xnn = ([unit16.newfrequencepsn[0], unit16.newfrequencepsn[1], unit16.newfrequencepsn[2],
        unit16.newfrequencepsn[3], unit16.newfrequencepsn[4], unit16.newfrequencepsn[5],
        unit16.newfrequencepsn[6], unit16.newfrequencepsn[7], unit16.newfrequencepsn[8]])
```

```
Ynn = ([unit8.newelektromagnetikpsn[0], unit8.newelektromagnetikpsn[1],
        unit8.newelektromagnetikpsn[2], unit8.newelektromagnetikpsn[3],
        unit8.newelektromagnetikpsn[4], unit8.newelektromagnetikpsn[5],
        unit8.newelektromagnetikpsn[6], unit8.newelektromagnetikpsn[7],
        unit8.newelektromagnetikpsn[8]])
Znn = ([unit12.newgravpsn[0], unit12.newgravpsn[1], unit12.newgravpsn[2], unit12.newgravpsn[3],
        unit12.newgravpsn[4], unit12.newgravpsn[5], unit12.newgravpsn[6], unit12.newgravpsn[7],
        unit12.newgravpsn[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Frequency \n taking into account speed of light \n and Compton
wavelength',
              fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 44. Interrelation of frequency,\n"
          "gravity and \n electromagnetism in neutron",
          transform=ax.transAxes, fontsize = 16)

# Interrelation of frequency, gravity and electromagnetism in pseudo newproton, 3D graf

ax = fig.add_subplot(1, 2, 2, projection='3d')

Xnn = ([unit17.newfrequencepsp[0], unit17.newfrequencepsp[1], unit17.newfrequencepsp[2],
        unit17.newfrequencepsp[3], unit17.newfrequencepsp[4], unit17.newfrequencepsp[5],
        unit17.newfrequencepsp[6], unit17.newfrequencepsp[7], unit17.newfrequencepsp[8]])
Ynn = ([unit9.newelektromagnetikpsp[0], unit9.newelektromagnetikpsp[1],
        unit9.newelektromagnetikpsp[2], unit9.newelektromagnetikpsp[3],
        unit9.newelektromagnetikpsp[4], unit9.newelektromagnetikpsp[5],
        unit9.newelektromagnetikpsp[6], unit9.newelektromagnetikpsp[7],
        unit9.newelektromagnetikpsp[8]])
Znn = ([unit13.newgravpsp[0], unit13.newgravpsp[1], unit13.newgravpsp[2], unit13.newgravpsp[3],
        unit13.newgravpsp[4], unit13.newgravpsp[5], unit13.newgravpsp[6], unit13.newgravpsp[7],
        unit13.newgravpsp[8]])

ax.plot(Xnn,Ynn,Znn)

ax.set_xlabel('\n \n \n Frequency \n taking into account speed of light \n and Compton
wavelength',
              fontsize = 15)
ax.set_zlabel('\n \n \n \n Electromagnetic \n indicator \n ', fontsize = 15)
ax.set_ylabel('\n \n \n Gravity \n indicator\n ', fontsize = 15)

ax.text2D(0.2, 0.95,
          "Graph # 45. Interrelation of frequency,\n"
          "gravity and electromagnetism in proton",
          transform=ax.transAxes, fontsize = 16)

print('\n Significant comments. Table 1.')
print(table1, "\n")

print("\n Values of new quarks 'u' and 'd' by \n"
      "shells in Qe (electron charges). Table 2. \n")
print(table)

print("   ", '\n Values of new quarks "u" by shells. Table 3. \n')
print(table2)

print("   ", '\n Values of new quarks "d" by shells. Table 4. \n')
print(table3)

print('\n Detailed description for new proton by shells. Table 5. \n')
print(table4)

print('\n Detailed description for new neutron, by shells. Table 6. \n')
print(table5)

print("\n Values of quarks 'u' and 'd' by \n"
      "shells in Qe (electron charges) \n"
     "for particles. Table 7.")

print(pstable)

print("   ", '\n Values of quarks "u" by shells for particles. Table 8. \n')

print(pstable2)

print("   ", '\n Values of quarks "d" by shells for particles. Table 9. \n')

print(pstable3)

print('\n Detailed description for proton by shells. Table 10. \n')

print(pstable4)

print('\n Detailed description for neutron by shells. Table 11. \n')

print(pstable5)

conclusion = [[0, 'The algorithm declared in "Significant comments" in \n'
               'Table 1 in items 6 to 10 inclusive has been successfully \n'
               'implemented in the presented program code.\n', 'Tests are presented'],
            [1, 'Neutron test \n' '\nThis allows me to assert that there is no \n'
             '"anomalous magnetic moment" effect for the neutron \n'
             'Therefore, the Dirac equation is valid for the neutron\n'
             '\n100% coincidence of the data obtained by the program \n'
             'according to the algorithm with publicly available \n'
             'experimental data. \n', k21], [2, 'Proton test\n'
             '\n100% coincidence of the data obtained by the program \n'
             'according to the algorithm with publicly available \n'
             'experimental data. \n', k22],
              [3, 'The excess of the value of the new proton charge on\n'
             'the charge of a proton, % \n', k231 or k232 or k233],
            [4, 'The magnitude of the charge of the new neutron modulo \n'
             'The new neutron has a magnetic moment.\n'
             "Dirac's equation is true again.\n", k24],
            [5, 'The “u” and “d” quarks have “twin” quarks,\n'
             'a new “u” quark and a new “d” quark. \n',
             'new quarks - Table # 2, quarks - Table # 7 \n'],
            [6, 'Electric charges on the inner shells of quarks\n'
             '“u” and “d” are opposite, on the outer shell \n'
             'they have the same sign. \n', 'Graph # 1, Values for mass, electric \n'
             'charge, volume are given in the tables: \n' '"u" - Table # 8 \n'
             '"d" - Table # 9 \n'], [7, 'The charges of the new quarks have the same \n'
             'sign in the inner and outer shells \n', 'Graph # 2, Values for mass, electric \n'
             'charge, volume are given in the tables: \n' 'new "u" - Table # 3 \n'
             'new "d" - Table # 4 \n'], [8, 'The middle shell of the “u” and “d” \n'
             'quarks has a negative mass. \n', "Graph # 3 \n"],
            [9, 'The shell of new quarks only has positive mass. \n',
             'Graph # 4 \n'], [10, 'It was modeled and calculated that a proton, a \n'
             'neutron, a new proton, a new neutron each \n'
             'have 9 inner shells.', 'proton - Table # 10 \n' 'neutron - Table # 11 \n'
            'new proton - Table # 5 \n' 'new neutron - Table # 6 \n'],
            [11, 'The deltas for the shells between the\n'
             'masses of the neutron - proton and new \n' 'neutron - new proton \n'
             'are calculated \n', 'Graph # 5 \n'], [12, 'The values of the masses of the \n'
             'proton, neutron, new proton, neutron \n' 'by shells for the first phase of the\n'
             'cycle are calculated.' 'The data demonstrate that a proton, a \n'
             'neutron have negative masses on some \n' 'shells, and a new proton, a new neutron 
\n'
             'have positive masses for all shells.\n'
             'Consequently, a proton, a neutron have a \n' 'long lifetime.\n'
             'The new proton, the new neutron, have \n' 'a short lifetime.\n',
             'proton - Graph # 6 \n' 'neutron - Graph # 12 \n' 'new proton - Graph # 18 \n'
             'newneutron - Graph # 20 \n'], [13, 'New particles that carry electric\n'
             'charge are presented.\n', 'I named them microplus and microminus.'],
            [14, "The magnitude of the electric charge\n" "microplus and microminus (C):\n",
             unit18.melectron_charge_amount], [15, 'Microplus and microminus mass (Kg):\n',
             unit18.melectron_mass_amount], [16, 'Volume microplus and microminus (cbm):\n',
             unit18.melectron_volume_amount], [17, 'Several histograms are presented showing the 
\n'
             'delta between particle masses for different phases \n' 'of the shell cycle. \n',
             'The movement of charged particles is taken \n'
             'into account, only. Graph ## 7-10, 13-15 \n' '19, 21, 22\n'],
            [18, 'Several histograms showing the particle \n'
             'volume for the first phase of the shell cycle\n'
             'will allow everyone to better understand the \n'
             'structure of the particles.\n', 'Graph ## 11; 17; 23 \n\n'],
            [19, 'Changes in the magnitude of the electric \n'
             'charge over the shells for the first phase for \n'
             'a proton and a neutron, a new proton and a new \n'
             'neutron clearly demonstrate the differences in \n'
             'the distribution of the electric charge. \n', 'Graph ## 24, 25 \n'],
            [20, 'Changes in the magnitude of the electric \n'
             'charge over the shells for each phase of the \n'
             'particle cycle shows changes in the distribution \n'
             'of the electric charge.\n', 'Graph ## 26, 28, 30, 32 \n'
            'The new proton has 5 phases in a cycle, the rest of \n'
             'the particles have 4 phases.\n'], [21, '3D models of the distribution of electric 
\n'
             'charges of particles have an identical shape\n', 'Graph ## 27, 29, 31, 33 \n'
            'There is a difference in dimension between the new \n'
             'proton, the new neutron and the proton, the neutron. \n'],
             [22, 'Regardless of the type of particle, combination \n'
              'of particle characteristics, combination of\n'
              'fundamental interactions for them in 3D form,\n'
              'I got one or more connected triangles.\n', 'Graph ## 34-45\n'
             'The result obtained suggests that the relationship \n'
              'of the fundamental forces of nature, including\n'
              'field Higgs, mass, charge, size, can be \n'
              'represented as a spatial pyramid 8 order.\n'],
             [23, 'For visualization, it is proposed to present\n'
              'a three-dimensional pyramid with a rectangular base,\n'
              'in which each edge corresponds to one of 5 fundamental\n'
              'forces or mass, charge, volume.\n',
              'Placing 5 fundamental forces, mass, charge, volume in\n'
              'accordance with the edges of the pyramid creates a\n'
              'vision of the possibility of combinations.\n']]

table21 = PrettyTable(['#', 'Result', 'Comments'])

for rec in conclusion:
    table21.add_row(rec)

print('\n Conclusion. Table 12.')
print(table21, "\n")
```