
codata Documentation

Release 0.7.0

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Apr 29, 2023

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GETTING STARTED

1.1 codata

codata provides, automatically generated, source files for the latest codata constants (2018). The raw codata from <http://physics.nist.gov/constants> are parsed line by line and converted into declarations as constants for different languages:

- Fortran module named *fcodata.f90*
- C header named *ccodata.h*
- Python module named *pycodata.py*
- CPython extension named *cpycodata.c*

The sources can be directly included in projects where they are needed.

1.1.1 How to install

Copy and paste the source code for the language of your choice.

1.1.2 Dependencies

```
gcc>=4.6 or msvc>=14  
gfortran>=4.6 or ifort>=18  
cmake>=3.10
```

1.1.3 License

GNU General Public License v3 (GPLv3)

1.2 pycodata

Python module containing the codata constants.

For now, the wrapper must be compiled using the compiler that was used to compile your python interpreter.

1.2.1 How to install

```
pip install pycodata
```

1.2.2 Dependencies

1.2.3 License

GNU General Public License v3 (GPLv3)

1.3 Examples

RELEASE NOTES

2.1 Codata 0.7.0 Release Note

2.1.1 Changes

- Migrate documentation from doxygen to sphinx+breath.
- Add YEAR constant indicating the year of the codata constants.
- Refractoring

2.1.2 Download

Codata Releases

PYPI

2.1.3 Contributors

Milan Skocic

2.1.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/0.6.0...0.7.0>

2.2 Codata 0.6.0 Release Note

2.2.1 Changes

- Created documentation.
- Fixed missing uncertainties for Cpython.

2.2.2 Download

Codata Releases

PYPI

2.2.3 Contributors

Milan Skocic

2.2.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/0.5.0...0.6.0>

2.3 Codata 0.5.0 Release Note

2.3.1 Changes

- Changed the complete approach by not generating a library but only source files for different languages.
- Available languages: Fortran, C, python, CPython

2.3.2 Download

Codata Releases

PYPI

2.3.3 Contributors

Milan Skocic

2.3.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/0.4.0...0.5.0>

2.4 Codata 0.4.0 Release Note

2.4.1 Changes

- Bring back pywrapper in the codata repository to sync versions.
- Improvements of the documentation.

2.4.2 Download

Codata Releases

PYPI

2.4.3 Contributors

Milan Skocic

2.4.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/0.3.0...0.4.0>

2.5 Codata 0.3.0 Release Note

2.5.1 Changes

- Only last codata constants.

2.5.2 Download

Codata Releases

PYPI

2.5.3 Contributors

Milan Skocic

2.5.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/0.2.1...0.3.0>

2.6 Codata 0.2.1 Release Note

2.6.1 Changes

- Integration of Intel Fortran compiler and MSVC in cmake scripts.
- Add specifications and instructions for compiling on Windows

2.6.2 Download

Codata Releases

PYPI

2.6.3 Contributors

Milan Skocic

2.6.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/0.2.0...0.2.1>

2.7 Codata 0.2.0 Release Note

2.7.1 Changes

- Bug fixes for the codata 2010.
- Bug fixes in the tests linked to the codata 2010.
- Add python wrapper for the number of constants method.

2.7.2 Download

Codata Releases

PYPI

2.7.3 Contributors

Milan Skocic

2.7.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/0.1.0...0.2.0>

2.8 Codata 0.1.0 Release Note

2.8.1 Changes

Implementation of:

- the parser of the codata raw data
- the generator of the Fortran modules
- the C API and C header
- the python wrapper (will be moved to its repository next release).

2.8.2 Download

Codata Releases

PYPI

2.8.3 Contributors

Milan Skocic

2.8.4 Commits

Full Changelog: <https://github.com/MilanSkocic/codata/compare/...0.1.0>

AUTOGENERATED DOCUMENTATION

3.1 codata

The available codata constants are listed here:

```

YEAR = 2018

ALPHA_PARTICLE_ELECTRON_MASS_RATIO = 7294.29954142e0
U_ALPHA_PARTICLE_ELECTRON_MASS_RATIO = 0.00000024e0

ALPHA_PARTICLE_MASS = 6.6446573357e-27 kg
U_ALPHA_PARTICLE_MASS = 0.0000000020e-27 kg

ALPHA_PARTICLE_MASS_ENERGY_EQUIVALENT = 5.9719201914e-10 J
U_ALPHA_PARTICLE_MASS_ENERGY_EQUIVALENT = 0.0000000018e-10 J

ALPHA_PARTICLE_MASS_ENERGY_EQUIVALENT_IN_MEV = 3727.3794066e0 MeV
U_ALPHA_PARTICLE_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.0000011e0 MeV

ALPHA_PARTICLE_MASS_IN_U = 4.001506179127e0 u
U_ALPHA_PARTICLE_MASS_IN_U = 0.000000000063e0 u

ALPHA_PARTICLE_MOLAR_MASS = 4.0015061777e-3 kg mol^-1
U_ALPHA_PARTICLE_MOLAR_MASS = 0.0000000012e-3 kg mol^-1

ALPHA_PARTICLE_PROTON_MASS_RATIO = 3.97259969009e0
U_ALPHA_PARTICLE_PROTON_MASS_RATIO = 0.00000000022e0

ALPHA_PARTICLE_RELATIVE_ATOMIC_MASS = 4.001506179127e0
U_ALPHA_PARTICLE_RELATIVE_ATOMIC_MASS = 0.000000000063e0

ANGSTROM_STAR = 1.00001495e-10 m
U_ANGSTROM_STAR = 0.00000090e-10 m

ATOMIC_MASS_CONSTANT = 1.66053906660e-27 kg
U_ATOMIC_MASS_CONSTANT = 0.00000000050e-27 kg

ATOMIC_MASS_CONSTANT_ENERGY_EQUIVALENT = 1.49241808560e-10 J
U_ATOMIC_MASS_CONSTANT_ENERGY_EQUIVALENT = 0.00000000045e-10 J

ATOMIC_MASS_CONSTANT_ENERGY_EQUIVALENT_IN_MEV = 931.49410242e0 MeV
U_ATOMIC_MASS_CONSTANT_ENERGY_EQUIVALENT_IN_MEV = 0.00000028e0 MeV

ATOMIC_MASS_UNIT_ELECTRON_VOLT_RELATIONSHIP = 9.3149410242e8 eV
U_ATOMIC_MASS_UNIT_ELECTRON_VOLT_RELATIONSHIP = 0.0000000028e8 eV

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ATOMIC_MASS_UNIT_HARTREE_RELATIONSHIP = 3.4231776874e7 E_h
U_ATOMIC_MASS_UNIT_HARTREE_RELATIONSHIP = 0.0000000010e7 E_h

ATOMIC_MASS_UNIT_HERTZ_RELATIONSHIP = 2.25234271871e23 Hz
U_ATOMIC_MASS_UNIT_HERTZ_RELATIONSHIP = 0.00000000068e23 Hz

ATOMIC_MASS_UNIT_INVERSE_METER_RELATIONSHIP = 7.5130066104e14 m^-1
U_ATOMIC_MASS_UNIT_INVERSE_METER_RELATIONSHIP = 0.0000000023e14 m^-1

ATOMIC_MASS_UNIT_JOULE_RELATIONSHIP = 1.49241808560e-10 J
U_ATOMIC_MASS_UNIT_JOULE_RELATIONSHIP = 0.00000000045e-10 J

ATOMIC_MASS_UNIT_KELVIN_RELATIONSHIP = 1.08095401916e13 K
U_ATOMIC_MASS_UNIT_KELVIN_RELATIONSHIP = 0.00000000033e13 K

ATOMIC_MASS_UNIT_KILOGRAM_RELATIONSHIP = 1.66053906660e-27 kg
U_ATOMIC_MASS_UNIT_KILOGRAM_RELATIONSHIP = 0.00000000050e-27 kg

ATOMIC_UNIT_OF_1ST_HYPERPOLARIZABILITY = 3.2063613061e-53 C^3 m^3 J^-2
U_ATOMIC_UNIT_OF_1ST_HYPERPOLARIZABILITY = 0.0000000015e-53 C^3 m^3 J^-2

ATOMIC_UNIT_OF_2ND_HYPERPOLARIZABILITY = 6.2353799905e-65 C^4 m^4 J^-3
U_ATOMIC_UNIT_OF_2ND_HYPERPOLARIZABILITY = 0.0000000038e-65 C^4 m^4 J^-3

ATOMIC_UNIT_OF_ACTION = 1.054571817e-34 J s
U_ATOMIC_UNIT_OF_ACTION = 0.0e0 J s

ATOMIC_UNIT_OF_CHARGE = 1.602176634e-19 C
U_ATOMIC_UNIT_OF_CHARGE = 0.0e0 C

ATOMIC_UNIT_OF_CHARGE_DENSITY = 1.08120238457e12 C m^-3
U_ATOMIC_UNIT_OF_CHARGE_DENSITY = 0.00000000049e12 C m^-3

ATOMIC_UNIT_OF_CURRENT = 6.623618237510e-3 A
U_ATOMIC_UNIT_OF_CURRENT = 0.000000000013e-3 A

ATOMIC_UNIT_OF_ELECTRIC_DIPOLE_MOM = 8.4783536255e-30 C m
U_ATOMIC_UNIT_OF_ELECTRIC_DIPOLE_MOM = 0.0000000013e-30 C m

ATOMIC_UNIT_OF_ELECTRIC_FIELD = 5.14220674763e11 V m^-1
U_ATOMIC_UNIT_OF_ELECTRIC_FIELD = 0.00000000078e11 V m^-1

ATOMIC_UNIT_OF_ELECTRIC_FIELD_GRADIENT = 9.7173624292e21 V m^-2
U_ATOMIC_UNIT_OF_ELECTRIC_FIELD_GRADIENT = 0.0000000029e21 V m^-2

ATOMIC_UNIT_OF_ELECTRIC_POLARIZABILITY = 1.64877727436e-41 C^2 m^2 J^-1
U_ATOMIC_UNIT_OF_ELECTRIC_POLARIZABILITY = 0.00000000050e-41 C^2 m^2 J^-1

ATOMIC_UNIT_OF_ELECTRIC_POTENTIAL = 27.211386245988e0 V
U_ATOMIC_UNIT_OF_ELECTRIC_POTENTIAL = 0.00000000053e0 V

ATOMIC_UNIT_OF_ELECTRIC_QUADRUPOLE_MOM = 4.4865515246e-40 C m^2
U_ATOMIC_UNIT_OF_ELECTRIC_QUADRUPOLE_MOM = 0.0000000014e-40 C m^2

ATOMIC_UNIT_OF_ENERGY = 4.3597447222071e-18 J

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U_ATOMIC_UNIT_OF_ENERGY = 0.00000000000085e-18 J

ATOMIC_UNIT_OF_FORCE = 8.2387234983e-8 N
U_ATOMIC_UNIT_OF_FORCE = 0.00000000012e-8 N

ATOMIC_UNIT_OF_LENGTH = 5.29177210903e-11 m
U_ATOMIC_UNIT_OF_LENGTH = 0.000000000080e-11 m

ATOMIC_UNIT_OF_MAG__DIPOLE_MOM = 1.85480201566e-23 J T^-1
U_ATOMIC_UNIT_OF_MAG__DIPOLE_MOM = 0.000000000056e-23 J T^-1

ATOMIC_UNIT_OF_MAG__FLUX_DENSITY = 2.35051756758e5 T
U_ATOMIC_UNIT_OF_MAG__FLUX_DENSITY = 0.000000000071e5 T

ATOMIC_UNIT_OF_MAGNETIZABILITY = 7.8910366008e-29 J T^-2
U_ATOMIC_UNIT_OF_MAGNETIZABILITY = 0.00000000048e-29 J T^-2

ATOMIC_UNIT_OF_MASS = 9.1093837015e-31 kg
U_ATOMIC_UNIT_OF_MASS = 0.00000000028e-31 kg

ATOMIC_UNIT_OF_MOMENTUM = 1.99285191410e-24 kg m s^-1
U_ATOMIC_UNIT_OF_MOMENTUM = 0.00000000030e-24 kg m s^-1

ATOMIC_UNIT_OF_PERMITTIVITY = 1.11265005545e-10 F m^-1
U_ATOMIC_UNIT_OF_PERMITTIVITY = 0.00000000017e-10 F m^-1

ATOMIC_UNIT_OF_TIME = 2.4188843265857e-17 s
U_ATOMIC_UNIT_OF_TIME = 0.0000000000047e-17 s

ATOMIC_UNIT_OF_VELOCITY = 2.18769126364e6 m s^-1
U_ATOMIC_UNIT_OF_VELOCITY = 0.00000000033e6 m s^-1

AVOGADRO_CONSTANT = 6.02214076e23 mol^-1
U_AVOGADRO_CONSTANT = 0.0e0 mol^-1

BOHR_MAGNETON = 9.2740100783e-24 J T^-1
U_BOHR_MAGNETON = 0.00000000028e-24 J T^-1

BOHR_MAGNETON_IN_EV_T = 5.7883818060e-5 eV T^-1
U_BOHR_MAGNETON_IN_EV_T = 0.00000000017e-5 eV T^-1

BOHR_MAGNETON_IN_HZ_T = 1.39962449361e10 Hz T^-1
U_BOHR_MAGNETON_IN_HZ_T = 0.00000000042e10 Hz T^-1

BOHR_MAGNETON_IN_INVERSE_METER_PER_TESLA = 46.686447783e0 m^-1 T^-1
U_BOHR_MAGNETON_IN_INVERSE_METER_PER_TESLA = 0.000000014e0 m^-1 T^-1

BOHR_MAGNETON_IN_K_T = 0.67171381563e0 K T^-1
U_BOHR_MAGNETON_IN_K_T = 0.00000000020e0 K T^-1

BOHR_RADIUS = 5.29177210903e-11 m
U_BOHR_RADIUS = 0.000000000080e-11 m

BOLTZMANN_CONSTANT = 1.380649e-23 J K^-1
U_BOLTZMANN_CONSTANT = 0.0e0 J K^-1

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BOLTZMANN_CONSTANT_IN_EV_K = 8.617333262e-5 eV K^-1
U_BOLTZMANN_CONSTANT_IN_EV_K = 0.0e0 eV K^-1

BOLTZMANN_CONSTANT_IN_HZ_K = 2.083661912e10 Hz K^-1
U_BOLTZMANN_CONSTANT_IN_HZ_K = 0.0e0 Hz K^-1

BOLTZMANN_CONSTANT_IN_INVERSE_METER_PER_KELVIN = 69.50348004e0 m^-1 K^-1
U_BOLTZMANN_CONSTANT_IN_INVERSE_METER_PER_KELVIN = 0.0e0 m^-1 K^-1

CHARACTERISTIC_IMPEDANCE_OF_VACUUM = 376.730313668e0 ohm
U_CHARACTERISTIC_IMPEDANCE_OF_VACUUM = 0.000000057e0 ohm

CLASSICAL_ELECTRON_RADIUS = 2.8179403262e-15 m
U_CLASSICAL_ELECTRON_RADIUS = 0.000000013e-15 m

COMPTON_WAVELENGTH = 2.42631023867e-12 m
U_COMPTON_WAVELENGTH = 0.0000000073e-12 m

CONDUCTANCE_QUANTUM = 7.748091729e-5 S
U_CONDUCTANCE_QUANTUM = 0.0e0 S

CONVENTIONAL_VALUE_OF_AMPERE_90 = 1.00000008887e0 A
U_CONVENTIONAL_VALUE_OF_AMPERE_90 = 0.0e0 A

CONVENTIONAL_VALUE_OF_COULOMB_90 = 1.00000008887e0 C
U_CONVENTIONAL_VALUE_OF_COULOMB_90 = 0.0e0 C

CONVENTIONAL_VALUE_OF_FARAD_90 = 0.99999998220e0 F
U_CONVENTIONAL_VALUE_OF_FARAD_90 = 0.0e0 F

CONVENTIONAL_VALUE_OF_HENRY_90 = 1.00000001779e0 H
U_CONVENTIONAL_VALUE_OF_HENRY_90 = 0.0e0 H

CONVENTIONAL_VALUE_OF_JOSEPHSON_CONSTANT = 483597.9e9 Hz V^-1
U_CONVENTIONAL_VALUE_OF_JOSEPHSON_CONSTANT = 0.0e0 Hz V^-1

CONVENTIONAL_VALUE_OF_OHM_90 = 1.00000001779e0 ohm
U_CONVENTIONAL_VALUE_OF_OHM_90 = 0.0e0 ohm

CONVENTIONAL_VALUE_OF_VOLT_90 = 1.00000010666e0 V
U_CONVENTIONAL_VALUE_OF_VOLT_90 = 0.0e0 V

CONVENTIONAL_VALUE_OF_VON_KLITZING_CONSTANT = 25812.807e0 ohm
U_CONVENTIONAL_VALUE_OF_VON_KLITZING_CONSTANT = 0.0e0 ohm

CONVENTIONAL_VALUE_OF_WATT_90 = 1.00000019553e0 W
U_CONVENTIONAL_VALUE_OF_WATT_90 = 0.0e0 W

COPPER_X_UNIT = 1.00207697e-13 m
U_COPPER_X_UNIT = 0.00000028e-13 m

DEUTERON_ELECTRON_MAG__MOM__RATIO = -4.664345551e-4
U_DEUTERON_ELECTRON_MAG__MOM__RATIO = 0.00000012e-4

DEUTERON_ELECTRON_MASS_RATIO = 3670.48296788e0
U_DEUTERON_ELECTRON_MASS_RATIO = 0.00000013e0

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DEUTERON_G_FACTOR = 0.8574382338e0
U_DEUTERON_G_FACTOR = 0.0000000022e0

DEUTERON_MAG__MOM = 4.330735094e-27 J T^-1
U_DEUTERON_MAG__MOM = 0.000000011e-27 J T^-1

DEUTERON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 4.669754570e-4
U_DEUTERON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 0.000000012e-4

DEUTERON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.8574382338e0
U_DEUTERON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.0000000022e0

DEUTERON_MASS = 3.3435837724e-27 kg
U_DEUTERON_MASS = 0.0000000010e-27 kg

DEUTERON_MASS_ENERGY_EQUIVALENT = 3.00506323102e-10 J
U_DEUTERON_MASS_ENERGY_EQUIVALENT = 0.00000000091e-10 J

DEUTERON_MASS_ENERGY_EQUIVALENT_IN_MEV = 1875.61294257e0 MeV
U_DEUTERON_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.00000057e0 MeV

DEUTERON_MASS_IN_U = 2.013553212745e0 u
U_DEUTERON_MASS_IN_U = 0.000000000040e0 u

DEUTERON_MOLAR_MASS = 2.01355321205e-3 kg mol^-1
U_DEUTERON_MOLAR_MASS = 0.00000000061e-3 kg mol^-1

DEUTERON_NEUTRON_MAG__MOM__RATIO = -0.44820653e0
U_DEUTERON_NEUTRON_MAG__MOM__RATIO = 0.00000011e0

DEUTERON_PROTON_MAG__MOM__RATIO = 0.30701220939e0
U_DEUTERON_PROTON_MAG__MOM__RATIO = 0.00000000079e0

DEUTERON_PROTON_MASS_RATIO = 1.99900750139e0
U_DEUTERON_PROTON_MASS_RATIO = 0.00000000011e0

DEUTERON_RELATIVE_ATOMIC_MASS = 2.013553212745e0
U_DEUTERON_RELATIVE_ATOMIC_MASS = 0.000000000040e0

DEUTERON_RMS_CHARGE_RADIUS = 2.12799e-15 m
U_DEUTERON_RMS_CHARGE_RADIUS = 0.00074e-15 m

ELECTRON_CHARGE_TO_MASS_QUOTIENT = -1.75882001076e11 C kg^-1
U_ELECTRON_CHARGE_TO_MASS_QUOTIENT = 0.00000000053e11 C kg^-1

ELECTRON_DEUTERON_MAG__MOM__RATIO = -2143.9234915e0
U_ELECTRON_DEUTERON_MAG__MOM__RATIO = 0.0000056e0

ELECTRON_DEUTERON_MASS_RATIO = 2.724437107462e-4
U_ELECTRON_DEUTERON_MASS_RATIO = 0.000000000096e-4

ELECTRON_G_FACTOR = -2.00231930436256e0
U_ELECTRON_G_FACTOR = 0.00000000000035e0

ELECTRON_GYROMAG__RATIO = 1.76085963023e11 s^-1 T^-1

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U_ELECTRON_GYROMAG__RATIO = 0.00000000053e11 s^-1 T^-1

ELECTRON_GYROMAG__RATIO_IN_MHZ_T = 28024.9514242e0 MHz T^-1
U_ELECTRON_GYROMAG__RATIO_IN_MHZ_T = 0.0000085e0 MHz T^-1

ELECTRON_HELION_MASS_RATIO = 1.819543074573e-4
U_ELECTRON_HELION_MASS_RATIO = 0.000000000079e-4

ELECTRON_MAG__MOM = -9.2847647043e-24 J T^-1
U_ELECTRON_MAG__MOM = 0.0000000028e-24 J T^-1

ELECTRON_MAG__MOM__ANOMALY = 1.15965218128e-3
U_ELECTRON_MAG__MOM__ANOMALY = 0.00000000018e-3

ELECTRON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = -1.00115965218128e0
U_ELECTRON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 0.00000000000018e0

ELECTRON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = -1838.28197188e0
U_ELECTRON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.00000011e0

ELECTRON_MASS = 9.1093837015e-31 kg
U_ELECTRON_MASS = 0.0000000028e-31 kg

ELECTRON_MASS_ENERGY_EQUIVALENT = 8.1871057769e-14 J
U_ELECTRON_MASS_ENERGY_EQUIVALENT = 0.0000000025e-14 J

ELECTRON_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.51099895000e0 MeV
U_ELECTRON_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.00000000015e0 MeV

ELECTRON_MASS_IN_U = 5.48579909065e-4 u
U_ELECTRON_MASS_IN_U = 0.00000000016e-4 u

ELECTRON_MOLAR_MASS = 5.4857990888e-7 kg mol^-1
U_ELECTRON_MOLAR_MASS = 0.0000000017e-7 kg mol^-1

ELECTRON_MUON_MAG__MOM__RATIO = 206.7669883e0
U_ELECTRON_MUON_MAG__MOM__RATIO = 0.0000046e0

ELECTRON_MUON_MASS_RATIO = 4.83633169e-3
U_ELECTRON_MUON_MASS_RATIO = 0.00000011e-3

ELECTRON_NEUTRON_MAG__MOM__RATIO = 960.92050e0
U_ELECTRON_NEUTRON_MAG__MOM__RATIO = 0.00023e0

ELECTRON_NEUTRON_MASS_RATIO = 5.4386734424e-4
U_ELECTRON_NEUTRON_MASS_RATIO = 0.0000000026e-4

ELECTRON_PROTON_MAG__MOM__RATIO = -658.21068789e0
U_ELECTRON_PROTON_MAG__MOM__RATIO = 0.00000020e0

ELECTRON_PROTON_MASS_RATIO = 5.44617021487e-4
U_ELECTRON_PROTON_MASS_RATIO = 0.00000000033e-4

ELECTRON_RELATIVE_ATOMIC_MASS = 5.48579909065e-4
U_ELECTRON_RELATIVE_ATOMIC_MASS = 0.00000000016e-4

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ELECTRON_TAU_MASS_RATIO = 2.87585e-4
U_ELECTRON_TAU_MASS_RATIO = 0.00019e-4

ELECTRON_TO_ALPHA_PARTICLE_MASS_RATIO = 1.370933554787e-4
U_ELECTRON_TO_ALPHA_PARTICLE_MASS_RATIO = 0.000000000045e-4

ELECTRON_TO_SHIELDED_HELION_MAG_MOM_RATIO = 864.058257e0
U_ELECTRON_TO_SHIELDED_HELION_MAG_MOM_RATIO = 0.000010e0

ELECTRON_TO_SHIELDED_PROTON_MAG_MOM_RATIO = -658.2275971e0
U_ELECTRON_TO_SHIELDED_PROTON_MAG_MOM_RATIO = 0.0000072e0

ELECTRON_TRITON_MASS_RATIO = 1.819200062251e-4
U_ELECTRON_TRITON_MASS_RATIO = 0.000000000090e-4

ELECTRON_VOLT = 1.602176634e-19 J
U_ELECTRON_VOLT = 0.0e0 J

ELECTRON_VOLT_ATOMIC_MASS_UNIT_RELATIONSHIP = 1.07354410233e-9 u
U_ELECTRON_VOLT_ATOMIC_MASS_UNIT_RELATIONSHIP = 0.00000000032e-9 u

ELECTRON_VOLT_HARTREE_RELATIONSHIP = 3.6749322175655e-2 E_h
U_ELECTRON_VOLT_HARTREE_RELATIONSHIP = 0.000000000071e-2 E_h

ELECTRON_VOLT_HERTZ_RELATIONSHIP = 2.417989242e14 Hz
U_ELECTRON_VOLT_HERTZ_RELATIONSHIP = 0.0e0 Hz

ELECTRON_VOLT_INVERSE_METER_RELATIONSHIP = 8.065543937e5 m^-1
U_ELECTRON_VOLT_INVERSE_METER_RELATIONSHIP = 0.0e0 m^-1

ELECTRON_VOLT_JOULE_RELATIONSHIP = 1.602176634e-19 J
U_ELECTRON_VOLT_JOULE_RELATIONSHIP = 0.0e0 J

ELECTRON_VOLT_KELVIN_RELATIONSHIP = 1.160451812e4 K
U_ELECTRON_VOLT_KELVIN_RELATIONSHIP = 0.0e0 K

ELECTRON_VOLT_KILOGRAM_RELATIONSHIP = 1.782661921e-36 kg
U_ELECTRON_VOLT_KILOGRAM_RELATIONSHIP = 0.0e0 kg

ELEMENTARY_CHARGE = 1.602176634e-19 C
U_ELEMENTARY_CHARGE = 0.0e0 C

ELEMENTARY_CHARGE_OVER_H_BAR = 1.519267447e15 A J^-1
U_ELEMENTARY_CHARGE_OVER_H_BAR = 0.0e0 A J^-1

FARADAY_CONSTANT = 96485.33212e0 C mol^-1
U_FARADAY_CONSTANT = 0.0e0 C mol^-1

FERMI_COUPLING_CONSTANT = 1.1663787e-5 GeV^-2
U_FERMI_COUPLING_CONSTANT = 0.0000006e-5 GeV^-2

FINE_STRUCTURE_CONSTANT = 7.2973525693e-3
U_FINE_STRUCTURE_CONSTANT = 0.0000000011e-3

FIRST_RADIATION_CONSTANT = 3.741771852e-16 W m^2
U_FIRST_RADIATION_CONSTANT = 0.0e0 W m^2

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FIRST_RADIATION_CONSTANT_FOR_SPECTRAL_RADIANCE = 1.191042972e-16 W m² sr⁻¹
 U_FIRST_RADIATION_CONSTANT_FOR_SPECTRAL_RADIANCE = 0.0e0 W m² sr⁻¹

HARTREE_ATOMIC_MASS_UNIT_RELATIONSHIP = 2.92126232205e-8 u
 U_HARTREE_ATOMIC_MASS_UNIT_RELATIONSHIP = 0.00000000088e-8 u

HARTREE_ELECTRON_VOLT_RELATIONSHIP = 27.211386245988e0 eV
 U_HARTREE_ELECTRON_VOLT_RELATIONSHIP = 0.00000000053e0 eV

HARTREE_ENERGY = 4.3597447222071e-18 J
 U_HARTREE_ENERGY = 0.00000000085e-18 J

HARTREE_ENERGY_IN_EV = 27.211386245988e0 eV
 U_HARTREE_ENERGY_IN_EV = 0.00000000053e0 eV

HARTREE_HERTZ_RELATIONSHIP = 6.579683920502e15 Hz
 U_HARTREE_HERTZ_RELATIONSHIP = 0.00000000013e15 Hz

HARTREE_INVERSE_METER_RELATIONSHIP = 2.1947463136320e7 m⁻¹
 U_HARTREE_INVERSE_METER_RELATIONSHIP = 0.00000000043e7 m⁻¹

HARTREE_JOULE_RELATIONSHIP = 4.3597447222071e-18 J
 U_HARTREE_JOULE_RELATIONSHIP = 0.00000000085e-18 J

HARTREE_KELVIN_RELATIONSHIP = 3.1577502480407e5 K
 U_HARTREE_KELVIN_RELATIONSHIP = 0.00000000061e5 K

HARTREE_KILOGRAM_RELATIONSHIP = 4.8508702095432e-35 kg
 U_HARTREE_KILOGRAM_RELATIONSHIP = 0.00000000094e-35 kg

HELION_ELECTRON_MASS_RATIO = 5495.88528007e0
 U_HELION_ELECTRON_MASS_RATIO = 0.00000024e0

HELION_G_FACTOR = -4.255250615e0
 U_HELION_G_FACTOR = 0.00000050e0

HELION_MAG__MOM = -1.074617532e-26 J T⁻¹
 U_HELION_MAG__MOM = 0.00000013e-26 J T⁻¹

HELION_MAG__MOM__TO_BOHR_MAGNETON_RATIO = -1.158740958e-3
 U_HELION_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 0.00000014e-3

HELION_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = -2.127625307e0
 U_HELION_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.00000025e0

HELION_MASS = 5.0064127796e-27 kg
 U_HELION_MASS = 0.000000015e-27 kg

HELION_MASS_ENERGY_EQUIVALENT = 4.4995394125e-10 J
 U_HELION_MASS_ENERGY_EQUIVALENT = 0.000000014e-10 J

HELION_MASS_ENERGY_EQUIVALENT_IN_MEV = 2808.39160743e0 MeV
 U_HELION_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.00000085e0 MeV

HELION_MASS_IN_U = 3.014932247175e0 u

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U_HELION_MASS_IN_U = 0.000000000097e0 u

HELION_MOLAR_MASS = 3.01493224613e-3 kg mol^-1
U_HELION_MOLAR_MASS = 0.00000000091e-3 kg mol^-1

HELION_PROTON_MASS_RATIO = 2.99315267167e0
U_HELION_PROTON_MASS_RATIO = 0.00000000013e0

HELION_RELATIVE_ATOMIC_MASS = 3.014932247175e0
U_HELION_RELATIVE_ATOMIC_MASS = 0.000000000097e0

HELION_SHIELDING_SHIFT = 5.996743e-5
U_HELION_SHIELDING_SHIFT = 0.000010e-5

HERTZ_ATOMIC_MASS_UNIT_RELATIONSHIP = 4.4398216652e-24 u
U_HERTZ_ATOMIC_MASS_UNIT_RELATIONSHIP = 0.00000000013e-24 u

HERTZ_ELECTRON_VOLT_RELATIONSHIP = 4.135667696e-15 eV
U_HERTZ_ELECTRON_VOLT_RELATIONSHIP = 0.0e0 eV

HERTZ_HARTREE_RELATIONSHIP = 1.5198298460570e-16 E_h
U_HERTZ_HARTREE_RELATIONSHIP = 0.0000000000029e-16 E_h

HERTZ_INVERSE_METER_RELATIONSHIP = 3.335640951e-9 m^-1
U_HERTZ_INVERSE_METER_RELATIONSHIP = 0.0e0 m^-1

HERTZ_JOULE_RELATIONSHIP = 6.62607015e-34 J
U_HERTZ_JOULE_RELATIONSHIP = 0.0e0 J

HERTZ_KELVIN_RELATIONSHIP = 4.799243073e-11 K
U_HERTZ_KELVIN_RELATIONSHIP = 0.0e0 K

HERTZ_KILOGRAM_RELATIONSHIP = 7.372497323e-51 kg
U_HERTZ_KILOGRAM_RELATIONSHIP = 0.0e0 kg

HYPERFINE_TRANSITION_FREQUENCY_OF_CS_133 = 9192631770.0e0 Hz
U_HYPERFINE_TRANSITION_FREQUENCY_OF_CS_133 = 0.0e0 Hz

INVERSE_FINE_STRUCTURE_CONSTANT = 137.035999084e0
U_INVERSE_FINE_STRUCTURE_CONSTANT = 0.000000021e0

INVERSE_METER_ATOMIC_MASS_UNIT_RELATIONSHIP = 1.33102505010e-15 u
U_INVERSE_METER_ATOMIC_MASS_UNIT_RELATIONSHIP = 0.00000000040e-15 u

INVERSE_METER_ELECTRON_VOLT_RELATIONSHIP = 1.239841984e-6 eV
U_INVERSE_METER_ELECTRON_VOLT_RELATIONSHIP = 0.0e0 eV

INVERSE_METER_HARTREE_RELATIONSHIP = 4.5563352529120e-8 E_h
U_INVERSE_METER_HARTREE_RELATIONSHIP = 0.0000000000088e-8 E_h

INVERSE_METER_HERTZ_RELATIONSHIP = 299792458.0e0 Hz
U_INVERSE_METER_HERTZ_RELATIONSHIP = 0.0e0 Hz

INVERSE_METER_JOULE_RELATIONSHIP = 1.986445857e-25 J
U_INVERSE_METER_JOULE_RELATIONSHIP = 0.0e0 J

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INVERSE_METER_KELVIN_RELATIONSHIP = 1.438776877e-2 K
U_INVERSE_METER_KELVIN_RELATIONSHIP = 0.0e0 K

INVERSE_METER_KILOGRAM_RELATIONSHIP = 2.210219094e-42 kg
U_INVERSE_METER_KILOGRAM_RELATIONSHIP = 0.0e0 kg

INVERSE_OF_CONDUCTANCE_QUANTUM = 12906.40372e0 ohm
U_INVERSE_OF_CONDUCTANCE_QUANTUM = 0.0e0 ohm

JOSEPHSON_CONSTANT = 483597.8484e9 Hz V^-1
U_JOSEPHSON_CONSTANT = 0.0e0 Hz V^-1

JOULE_ATOMIC_MASS_UNIT_RELATIONSHIP = 6.7005352565e9 u
U_JOULE_ATOMIC_MASS_UNIT_RELATIONSHIP = 0.0000000020e9 u

JOULE_ELECTRON_VOLT_RELATIONSHIP = 6.241509074e18 eV
U_JOULE_ELECTRON_VOLT_RELATIONSHIP = 0.0e0 eV

JOULE_HARTREE_RELATIONSHIP = 2.2937122783963e17 E_h
U_JOULE_HARTREE_RELATIONSHIP = 0.0000000000045e17 E_h

JOULE_HERTZ_RELATIONSHIP = 1.509190179e33 Hz
U_JOULE_HERTZ_RELATIONSHIP = 0.0e0 Hz

JOULE_INVERSE_METER_RELATIONSHIP = 5.034116567e24 m^-1
U_JOULE_INVERSE_METER_RELATIONSHIP = 0.0e0 m^-1

JOULE_KELVIN_RELATIONSHIP = 7.242970516e22 K
U_JOULE_KELVIN_RELATIONSHIP = 0.0e0 K

JOULE_KILOGRAM_RELATIONSHIP = 1.112650056e-17 kg
U_JOULE_KILOGRAM_RELATIONSHIP = 0.0e0 kg

KELVIN_ATOMIC_MASS_UNIT_RELATIONSHIP = 9.2510873014e-14 u
U_KELVIN_ATOMIC_MASS_UNIT_RELATIONSHIP = 0.0000000028e-14 u

KELVIN_ELECTRON_VOLT_RELATIONSHIP = 8.617333262e-5 eV
U_KELVIN_ELECTRON_VOLT_RELATIONSHIP = 0.0e0 eV

KELVIN_HARTREE_RELATIONSHIP = 3.1668115634556e-6 E_h
U_KELVIN_HARTREE_RELATIONSHIP = 0.0000000000061e-6 E_h

KELVIN_HERTZ_RELATIONSHIP = 2.083661912e10 Hz
U_KELVIN_HERTZ_RELATIONSHIP = 0.0e0 Hz

KELVIN_INVERSE_METER_RELATIONSHIP = 69.50348004e0 m^-1
U_KELVIN_INVERSE_METER_RELATIONSHIP = 0.0e0 m^-1

KELVIN_JOULE_RELATIONSHIP = 1.380649e-23 J
U_KELVIN_JOULE_RELATIONSHIP = 0.0e0 J

KELVIN_KILOGRAM_RELATIONSHIP = 1.536179187e-40 kg
U_KELVIN_KILOGRAM_RELATIONSHIP = 0.0e0 kg

KILOGRAM_ATOMIC_MASS_UNIT_RELATIONSHIP = 6.0221407621e26 u
U_KILOGRAM_ATOMIC_MASS_UNIT_RELATIONSHIP = 0.0000000018e26 u

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KILOGRAM_ELECTRON_VOLT_RELATIONSHIP = 5.609588603e35 eV
U_KILOGRAM_ELECTRON_VOLT_RELATIONSHIP = 0.0e0 eV

KILOGRAM_HARTREE_RELATIONSHIP = 2.0614857887409e34 E_h
U_KILOGRAM_HARTREE_RELATIONSHIP = 0.0000000000040e34 E_h

KILOGRAM_HERTZ_RELATIONSHIP = 1.356392489e50 Hz
U_KILOGRAM_HERTZ_RELATIONSHIP = 0.0e0 Hz

KILOGRAM_INVERSE_METER_RELATIONSHIP = 4.524438335e41 m^-1
U_KILOGRAM_INVERSE_METER_RELATIONSHIP = 0.0e0 m^-1

KILOGRAM_JOULE_RELATIONSHIP = 8.987551787e16 J
U_KILOGRAM_JOULE_RELATIONSHIP = 0.0e0 J

KILOGRAM_KELVIN_RELATIONSHIP = 6.509657260e39 K
U_KILOGRAM_KELVIN_RELATIONSHIP = 0.0e0 K

LATTICE_PARAMETER_OF_SILICON = 5.431020511e-10 m
U_LATTICE_PARAMETER_OF_SILICON = 0.000000089e-10 m

LATTICE_SPACING_OF_IDEAL_SI__220 = 1.920155716e-10 m
U_LATTICE_SPACING_OF_IDEAL_SI__220 = 0.000000032e-10 m

LOSCHMIDT_CONSTANT__273_15_K__100_KPA = 2.651645804e25 m^-3
U_LOSCHMIDT_CONSTANT__273_15_K__100_KPA = 0.0e0 m^-3

LOSCHMIDT_CONSTANT__273_15_K__101_325_KPA = 2.686780111e25 m^-3
U_LOSCHMIDT_CONSTANT__273_15_K__101_325_KPA = 0.0e0 m^-3

LUMINOUS EFFICACY = 683.0e0 lm W^-1
U_LUMINOUS EFFICACY = 0.0e0 lm W^-1

MAG__FLUX_QUANTUM = 2.067833848e-15 Wb
U_MAG__FLUX_QUANTUM = 0.0e0 Wb

MOLAR_GAS_CONSTANT = 8.314462618e0 J mol^-1 K^-1
U_MOLAR_GAS_CONSTANT = 0.0e0 J mol^-1 K^-1

MOLAR_MASS_CONSTANT = 0.99999999965e-3 kg mol^-1
U_MOLAR_MASS_CONSTANT = 0.00000000030e-3 kg mol^-1

MOLAR_MASS_OF_CARBON_12 = 11.9999999958e-3 kg mol^-1
U_MOLAR_MASS_OF_CARBON_12 = 0.0000000036e-3 kg mol^-1

MOLAR_PLANCK_CONSTANT = 3.990312712e-10 J Hz^-1 mol^-1
U_MOLAR_PLANCK_CONSTANT = 0.0e0 J Hz^-1 mol^-1

MOLAR_VOLUME_OF_IDEAL_GAS__273_15_K__100_KPA = 22.71095464e-3 m^3 mol^-1
U_MOLAR_VOLUME_OF_IDEAL_GAS__273_15_K__100_KPA = 0.0e0 m^3 mol^-1

MOLAR_VOLUME_OF_IDEAL_GAS__273_15_K__101_325_KPA = 22.41396954e-3 m^3 mol^-1
U_MOLAR_VOLUME_OF_IDEAL_GAS__273_15_K__101_325_KPA = 0.0e0 m^3 mol^-1

MOLAR_VOLUME_OF_SILICON = 1.205883199e-5 m^3 mol^-1

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U_MOLAR_VOLUME_OF_SILICON = 0.000000060e-5 m^3 mol^-1

MOLYBDENUM_X_UNIT = 1.00209952e-13 m
U_MOLYBDENUM_X_UNIT = 0.00000053e-13 m

MUON_COMPTON_WAVELENGTH = 1.173444110e-14 m
U_MUON_COMPTON_WAVELENGTH = 0.000000026e-14 m

MUON_ELECTRON_MASS_RATIO = 206.7682830e0
U_MUON_ELECTRON_MASS_RATIO = 0.0000046e0

MUON_G_FACTOR = -2.0023318418e0
U_MUON_G_FACTOR = 0.0000000013e0

MUON_MAG__MOM = -4.49044830e-26 J T^-1
U_MUON_MAG__MOM = 0.00000010e-26 J T^-1

MUON_MAG__MOM__ANOMALY = 1.16592089e-3
U_MUON_MAG__MOM__ANOMALY = 0.00000063e-3

MUON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = -4.84197047e-3
U_MUON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 0.00000011e-3

MUON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = -8.89059703e0
U_MUON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.00000020e0

MUON_MASS = 1.883531627e-28 kg
U_MUON_MASS = 0.000000042e-28 kg

MUON_MASS_ENERGY_EQUIVALENT = 1.692833804e-11 J
U_MUON_MASS_ENERGY_EQUIVALENT = 0.000000038e-11 J

MUON_MASS_ENERGY_EQUIVALENT_IN_MEV = 105.6583755e0 MeV
U_MUON_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.0000023e0 MeV

MUON_MASS_IN_U = 0.1134289259e0 u
U_MUON_MASS_IN_U = 0.0000000025e0 u

MUON_MOLAR_MASS = 1.134289259e-4 kg mol^-1
U_MUON_MOLAR_MASS = 0.000000025e-4 kg mol^-1

MUON_NEUTRON_MASS_RATIO = 0.1124545170e0
U_MUON_NEUTRON_MASS_RATIO = 0.0000000025e0

MUON_PROTON_MAG__MOM__RATIO = -3.183345142e0
U_MUON_PROTON_MAG__MOM__RATIO = 0.000000071e0

MUON_PROTON_MASS_RATIO = 0.1126095264e0
U_MUON_PROTON_MASS_RATIO = 0.0000000025e0

MUON_TAU_MASS_RATIO = 5.94635e-2
U_MUON_TAU_MASS_RATIO = 0.00040e-2

NATURAL_UNIT_OF_ACTION = 1.054571817e-34 J s
U_NATURAL_UNIT_OF_ACTION = 0.0e0 J s

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NATURAL_UNIT_OF_ACTION_IN_EV_S = 6.582119569e-16 eV s
U_NATURAL_UNIT_OF_ACTION_IN_EV_S = 0.0e0 eV s

NATURAL_UNIT_OF_ENERGY = 8.1871057769e-14 J
U_NATURAL_UNIT_OF_ENERGY = 0.0000000025e-14 J

NATURAL_UNIT_OF_ENERGY_IN_MEV = 0.51099895000e0 MeV
U_NATURAL_UNIT_OF_ENERGY_IN_MEV = 0.00000000015e0 MeV

NATURAL_UNIT_OF_LENGTH = 3.8615926796e-13 m
U_NATURAL_UNIT_OF_LENGTH = 0.0000000012e-13 m

NATURAL_UNIT_OF_MASS = 9.1093837015e-31 kg
U_NATURAL_UNIT_OF_MASS = 0.0000000028e-31 kg

NATURAL_UNIT_OF_MOMENTUM = 2.73092453075e-22 kg m s^-1
U_NATURAL_UNIT_OF_MOMENTUM = 0.00000000082e-22 kg m s^-1

NATURAL_UNIT_OF_MOMENTUM_IN_MEV_C = 0.51099895000e0 MeV/c
U_NATURAL_UNIT_OF_MOMENTUM_IN_MEV_C = 0.00000000015e0 MeV/c

NATURAL_UNIT_OF_TIME = 1.28808866819e-21 s
U_NATURAL_UNIT_OF_TIME = 0.00000000039e-21 s

NATURAL_UNIT_OF_VELOCITY = 299792458.0e0 m s^-1
U_NATURAL_UNIT_OF_VELOCITY = 0.0e0 m s^-1

NEUTRON_COMPTON_WAVELENGTH = 1.31959090581e-15 m
U_NEUTRON_COMPTON_WAVELENGTH = 0.00000000075e-15 m

NEUTRON_ELECTRON_MAG__MOM__RATIO = 1.04066882e-3
U_NEUTRON_ELECTRON_MAG__MOM__RATIO = 0.00000025e-3

NEUTRON_ELECTRON_MASS_RATIO = 1838.68366173e0
U_NEUTRON_ELECTRON_MASS_RATIO = 0.00000089e0

NEUTRON_G_FACTOR = -3.82608545e0
U_NEUTRON_G_FACTOR = 0.00000090e0

NEUTRON_GYROMAG__RATIO = 1.83247171e8 s^-1 T^-1
U_NEUTRON_GYROMAG__RATIO = 0.00000043e8 s^-1 T^-1

NEUTRON_GYROMAG__RATIO_IN_MHZ_T = 29.1646931e0 MHz T^-1
U_NEUTRON_GYROMAG__RATIO_IN_MHZ_T = 0.0000069e0 MHz T^-1

NEUTRON_MAG__MOM = -9.6623651e-27 J T^-1
U_NEUTRON_MAG__MOM = 0.0000023e-27 J T^-1

NEUTRON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = -1.04187563e-3
U_NEUTRON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 0.00000025e-3

NEUTRON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = -1.91304273e0
U_NEUTRON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.00000045e0

NEUTRON_MASS = 1.67492749804e-27 kg
U_NEUTRON_MASS = 0.00000000095e-27 kg

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NEUTRON_MASS_ENERGY_EQUIVALENT = 1.50534976287e-10 J
U_NEUTRON_MASS_ENERGY_EQUIVALENT = 0.000000000086e-10 J

NEUTRON_MASS_ENERGY_EQUIVALENT_IN_MEV = 939.56542052e0 MeV
U_NEUTRON_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.00000054e0 MeV

NEUTRON_MASS_IN_U = 1.00866491595e0 u
U_NEUTRON_MASS_IN_U = 0.000000000049e0 u

NEUTRON_MOLAR_MASS = 1.00866491560e-3 kg mol^-1
U_NEUTRON_MOLAR_MASS = 0.000000000057e-3 kg mol^-1

NEUTRON_MUON_MASS_RATIO = 8.89248406e0
U_NEUTRON_MUON_MASS_RATIO = 0.00000020e0

NEUTRON_PROTON_MAG__MOM__RATIO = -0.68497934e0
U_NEUTRON_PROTON_MAG__MOM__RATIO = 0.00000016e0

NEUTRON_PROTON_MASS_DIFFERENCE = 2.30557435e-30 kg
U_NEUTRON_PROTON_MASS_DIFFERENCE = 0.00000082e-30 kg

NEUTRON_PROTON_MASS_DIFFERENCE_ENERGY_EQUIVALENT = 2.07214689e-13 J
U_NEUTRON_PROTON_MASS_DIFFERENCE_ENERGY_EQUIVALENT = 0.00000074e-13 J

NEUTRON_PROTON_MASS_DIFFERENCE_ENERGY_EQUIVALENT_IN_MEV = 1.29333236e0 MeV
U_NEUTRON_PROTON_MASS_DIFFERENCE_ENERGY_EQUIVALENT_IN_MEV = 0.00000046e0 MeV

NEUTRON_PROTON_MASS_DIFFERENCE_IN_U = 1.38844933e-3 u
U_NEUTRON_PROTON_MASS_DIFFERENCE_IN_U = 0.00000049e-3 u

NEUTRON_PROTON_MASS_RATIO = 1.00137841931e0
U_NEUTRON_PROTON_MASS_RATIO = 0.000000000049e0

NEUTRON_RELATIVE_ATOMIC_MASS = 1.00866491595e0
U_NEUTRON_RELATIVE_ATOMIC_MASS = 0.000000000049e0

NEUTRON_TAU_MASS_RATIO = 0.528779e0
U_NEUTRON_TAU_MASS_RATIO = 0.000036e0

NEUTRON_TO_SHIELDED_PROTON_MAG__MOM__RATIO = -0.68499694e0
U_NEUTRON_TO_SHIELDED_PROTON_MAG__MOM__RATIO = 0.00000016e0

NEWTONIAN_CONSTANT_OF_GRAVITATION = 6.67430e-11 m^3 kg^-1 s^-2
U_NEWTONIAN_CONSTANT_OF_GRAVITATION = 0.00015e-11 m^3 kg^-1 s^-2

NEWTONIAN_CONSTANT_OF_GRAVITATION_OVER_H_BAR_C = 6.70883e-39 (GeV/c^2)^-2
U_NEWTONIAN_CONSTANT_OF_GRAVITATION_OVER_H_BAR_C = 0.00015e-39 (GeV/c^2)^-2

NUCLEAR_MAGNETON = 5.0507837461e-27 J T^-1
U_NUCLEAR_MAGNETON = 0.0000000015e-27 J T^-1

NUCLEAR_MAGNETON_IN_EV_T = 3.15245125844e-8 eV T^-1
U_NUCLEAR_MAGNETON_IN_EV_T = 0.00000000096e-8 eV T^-1

NUCLEAR_MAGNETON_IN_INVERSE_METER_PER_TESLA = 2.54262341353e-2 m^-1 T^-1

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U_NUCLEAR_MAGNETON_IN_INVERSE_METER_PER_TESLA = 0.000000000078e-2 m⁻¹ T⁻¹

NUCLEAR_MAGNETON_IN_K_T = 3.6582677756e-4 K T⁻¹

U_NUCLEAR_MAGNETON_IN_K_T = 0.0000000011e-4 K T⁻¹

NUCLEAR_MAGNETON_IN_MHZ_T = 7.6225932291e0 MHz T⁻¹

U_NUCLEAR_MAGNETON_IN_MHZ_T = 0.0000000023e0 MHz T⁻¹

PLANCK_CONSTANT = 6.62607015e-34 J Hz⁻¹

U_PLANCK_CONSTANT = 0.0e0 J Hz⁻¹

PLANCK_CONSTANT_IN_EV_HZ = 4.135667696e-15 eV Hz⁻¹

U_PLANCK_CONSTANT_IN_EV_HZ = 0.0e0 eV Hz⁻¹

PLANCK_LENGTH = 1.616255e-35 m

U_PLANCK_LENGTH = 0.000018e-35 m

PLANCK_MASS = 2.176434e-8 kg

U_PLANCK_MASS = 0.000024e-8 kg

PLANCK_MASS_ENERGY_EQUIVALENT_IN_GEV = 1.220890e19 GeV

U_PLANCK_MASS_ENERGY_EQUIVALENT_IN_GEV = 0.000014e19 GeV

PLANCK_TEMPERATURE = 1.416784e32 K

U_PLANCK_TEMPERATURE = 0.000016e32 K

PLANCK_TIME = 5.391247e-44 s

U_PLANCK_TIME = 0.000060e-44 s

PROTON_CHARGE_TO_MASS_QUOTIENT = 9.5788331560e7 C kg⁻¹

U_PROTON_CHARGE_TO_MASS_QUOTIENT = 0.0000000029e7 C kg⁻¹

PROTON_COMPTON_WAVELENGTH = 1.32140985539e-15 m

U_PROTON_COMPTON_WAVELENGTH = 0.00000000040e-15 m

PROTON_ELECTRON_MASS_RATIO = 1836.15267343e0

U_PROTON_ELECTRON_MASS_RATIO = 0.00000011e0

PROTON_G_FACTOR = 5.5856946893e0

U_PROTON_G_FACTOR = 0.0000000016e0

PROTON_GYROMAG_RATIO = 2.6752218744e8 s⁻¹ T⁻¹

U_PROTON_GYROMAG_RATIO = 0.0000000011e8 s⁻¹ T⁻¹

PROTON_GYROMAG_RATIO_IN_MHZ_T = 42.577478518e0 MHz T⁻¹

U_PROTON_GYROMAG_RATIO_IN_MHZ_T = 0.0000000018e0 MHz T⁻¹

PROTON_MAG_MOM = 1.41060679736e-26 J T⁻¹

U_PROTON_MAG_MOM = 0.00000000060e-26 J T⁻¹

PROTON_MAG_MOM_TO_BOHR_MAGNETON_RATIO = 1.52103220230e-3

U_PROTON_MAG_MOM_TO_BOHR_MAGNETON_RATIO = 0.00000000046e-3

PROTON_MAG_MOM_TO_NUCLEAR_MAGNETON_RATIO = 2.79284734463e0

U_PROTON_MAG_MOM_TO_NUCLEAR_MAGNETON_RATIO = 0.00000000082e0

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PROTON_MAG__SHIELDING_CORRECTION = 2.5689e-5
U_PROTON_MAG__SHIELDING_CORRECTION = 0.0011e-5

PROTON_MASS = 1.67262192369e-27 kg
U_PROTON_MASS = 0.00000000051e-27 kg

PROTON_MASS_ENERGY_EQUIVALENT = 1.50327761598e-10 J
U_PROTON_MASS_ENERGY_EQUIVALENT = 0.00000000046e-10 J

PROTON_MASS_ENERGY_EQUIVALENT_IN_MEV = 938.27208816e0 MeV
U_PROTON_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.00000029e0 MeV

PROTON_MASS_IN_U = 1.007276466621e0 u
U_PROTON_MASS_IN_U = 0.00000000053e0 u

PROTON_MOLAR_MASS = 1.00727646627e-3 kg mol^-1
U_PROTON_MOLAR_MASS = 0.00000000031e-3 kg mol^-1

PROTON_MUON_MASS_RATIO = 8.88024337e0
U_PROTON_MUON_MASS_RATIO = 0.00000020e0

PROTON_NEUTRON_MAG__MOM__RATIO = -1.45989805e0
U_PROTON_NEUTRON_MAG__MOM__RATIO = 0.00000034e0

PROTON_NEUTRON_MASS_RATIO = 0.99862347812e0
U_PROTON_NEUTRON_MASS_RATIO = 0.00000000049e0

PROTON_RELATIVE_ATOMIC_MASS = 1.007276466621e0
U_PROTON_RELATIVE_ATOMIC_MASS = 0.00000000053e0

PROTON_RMS_CHARGE_RADIUS = 8.414e-16 m
U_PROTON_RMS_CHARGE_RADIUS = 0.019e-16 m

PROTON_TAU_MASS_RATIO = 0.528051e0
U_PROTON_TAU_MASS_RATIO = 0.000036e0

QUANTUM_OF_CIRCULATION = 3.6369475516e-4 m^2 s^-1
U_QUANTUM_OF_CIRCULATION = 0.0000000011e-4 m^2 s^-1

QUANTUM_OF_CIRCULATION_TIMES_2 = 7.2738951032e-4 m^2 s^-1
U_QUANTUM_OF_CIRCULATION_TIMES_2 = 0.0000000022e-4 m^2 s^-1

REDUCED_COMPTON_WAVELENGTH = 3.8615926796e-13 m
U_REDUCED_COMPTON_WAVELENGTH = 0.0000000012e-13 m

REDUCED_MUON_COMPTON_WAVELENGTH = 1.867594306e-15 m
U_REDUCED_MUON_COMPTON_WAVELENGTH = 0.000000042e-15 m

REDUCED_NEUTRON_COMPTON_WAVELENGTH = 2.1001941552e-16 m
U_REDUCED_NEUTRON_COMPTON_WAVELENGTH = 0.0000000012e-16 m

REDUCED_PLANCK_CONSTANT = 1.054571817e-34 J s
U_REDUCED_PLANCK_CONSTANT = 0.0e0 J s

REDUCED_PLANCK_CONSTANT_IN_EV_S = 6.582119569e-16 eV s
U_REDUCED_PLANCK_CONSTANT_IN_EV_S = 0.0e0 eV s

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REDUCED_PLANCK_CONSTANT_TIMES_C_IN_MEV_FM = 197.3269804e0 MeV fm
U_REDUCED_PLANCK_CONSTANT_TIMES_C_IN_MEV_FM = 0.0e0 MeV fm

REDUCED_PROTON_COMPTON_WAVELENGTH = 2.10308910336e-16 m
U_REDUCED_PROTON_COMPTON_WAVELENGTH = 0.000000000064e-16 m

REDUCED_TAU_COMPTON_WAVELENGTH = 1.110538e-16 m
U_REDUCED_TAU_COMPTON_WAVELENGTH = 0.0000075e-16 m

RYDBERG_CONSTANT = 10973731.568160e0 m-1
U_RYDBERG_CONSTANT = 0.000021e0 m-1

RYDBERG_CONSTANT_TIMES_C_IN_HZ = 3.2898419602508e15 Hz
U_RYDBERG_CONSTANT_TIMES_C_IN_HZ = 0.0000000000064e15 Hz

RYDBERG_CONSTANT_TIMES_HC_IN_EV = 13.605693122994e0 eV
U_RYDBERG_CONSTANT_TIMES_HC_IN_EV = 0.000000000026e0 eV

RYDBERG_CONSTANT_TIMES_HC_IN_J = 2.1798723611035e-18 J
U_RYDBERG_CONSTANT_TIMES_HC_IN_J = 0.0000000000042e-18 J

SACKUR_TETRODE_CONSTANT__1_K__100_KPA = -1.15170753706e0
U_SACKUR_TETRODE_CONSTANT__1_K__100_KPA = 0.000000000045e0

SACKUR_TETRODE_CONSTANT__1_K__101_325_KPA = -1.16487052358e0
U_SACKUR_TETRODE_CONSTANT__1_K__101_325_KPA = 0.000000000045e0

SECOND_RADIATION_CONSTANT = 1.438776877e-2 m K
U_SECOND_RADIATION_CONSTANT = 0.0e0 m K

SHIELDED_HELION_GYROMAG__RATIO = 2.037894569e8 s-1 T-1
U_SHIELDED_HELION_GYROMAG__RATIO = 0.000000024e8 s-1 T-1

SHIELDED_HELION_GYROMAG__RATIO_IN_MHZ_T = 32.43409942e0 MHz T-1
U_SHIELDED_HELION_GYROMAG__RATIO_IN_MHZ_T = 0.00000038e0 MHz T-1

SHIELDED_HELION_MAG__MOM = -1.074553090e-26 J T-1
U_SHIELDED_HELION_MAG__MOM = 0.000000013e-26 J T-1

SHIELDED_HELION_MAG__MOM__TO_BOHR_MAGNETON_RATIO = -1.158671471e-3
U_SHIELDED_HELION_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 0.000000014e-3

SHIELDED_HELION_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = -2.127497719e0
U_SHIELDED_HELION_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.000000025e0

SHIELDED_HELION_TO_PROTON_MAG__MOM__RATIO = -0.7617665618e0
U_SHIELDED_HELION_TO_PROTON_MAG__MOM__RATIO = 0.0000000089e0

SHIELDED_HELION_TO_SHIELDED_PROTON_MAG__MOM__RATIO = -0.7617861313e0
U_SHIELDED_HELION_TO_SHIELDED_PROTON_MAG__MOM__RATIO = 0.0000000033e0

SHIELDED_PROTON_GYROMAG__RATIO = 2.675153151e8 s-1 T-1
U_SHIELDED_PROTON_GYROMAG__RATIO = 0.000000029e8 s-1 T-1

SHIELDED_PROTON_GYROMAG__RATIO_IN_MHZ_T = 42.57638474e0 MHz T-1

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U_SHIELDED_PROTON_GYROMAG_RATIO_IN_MHZ_T = 0.00000046e0 MHz T^-1

SHIELDED_PROTON_MAG_MOM = 1.410570560e-26 J T^-1
U_SHIELDED_PROTON_MAG_MOM = 0.000000015e-26 J T^-1

SHIELDED_PROTON_MAG_MOM_TO_BOHR_MAGNETON_RATIO = 1.520993128e-3
U_SHIELDED_PROTON_MAG_MOM_TO_BOHR_MAGNETON_RATIO = 0.000000017e-3

SHIELDED_PROTON_MAG_MOM_TO_NUCLEAR_MAGNETON_RATIO = 2.792775599e0
U_SHIELDED_PROTON_MAG_MOM_TO_NUCLEAR_MAGNETON_RATIO = 0.000000030e0

SHIELDING_DIFFERENCE_OF_D_AND_P_IN_HD = 2.0200e-8
U_SHIELDING_DIFFERENCE_OF_D_AND_P_IN_HD = 0.0020e-8

SHIELDING_DIFFERENCE_OF_T_AND_P_IN_HT = 2.4140e-8
U_SHIELDING_DIFFERENCE_OF_T_AND_P_IN_HT = 0.0020e-8

SPEED_OF_LIGHT_IN_VACUUM = 299792458.0e0 m s^-1
U_SPEED_OF_LIGHT_IN_VACUUM = 0.0e0 m s^-1

STANDARD_ACCELERATION_OF_GRAVITY = 9.80665e0 m s^-2
U_STANDARD_ACCELERATION_OF_GRAVITY = 0.0e0 m s^-2

STANDARD_ATMOSPHERE = 101325.0e0 Pa
U_STANDARD_ATMOSPHERE = 0.0e0 Pa

STANDARD_STATE_PRESSURE = 100000.0e0 Pa
U_STANDARD_STATE_PRESSURE = 0.0e0 Pa

STEFAN_BOLTZMANN_CONSTANT = 5.670374419e-8 W m^-2 K^-4
U_STEFAN_BOLTZMANN_CONSTANT = 0.0e0 W m^-2 K^-4

TAU_COMPTON_WAVELENGTH = 6.97771e-16 m
U_TAU_COMPTON_WAVELENGTH = 0.00047e-16 m

TAU_ELECTRON_MASS_RATIO = 3477.23e0
U_TAU_ELECTRON_MASS_RATIO = 0.23e0

TAU_ENERGY_EQUIVALENT = 1776.86e0 MeV
U_TAU_ENERGY_EQUIVALENT = 0.12e0 MeV

TAU_MASS = 3.16754e-27 kg
U_TAU_MASS = 0.00021e-27 kg

TAU_MASS_ENERGY_EQUIVALENT = 2.84684e-10 J
U_TAU_MASS_ENERGY_EQUIVALENT = 0.00019e-10 J

TAU_MASS_IN_U = 1.90754e0 u
U_TAU_MASS_IN_U = 0.00013e0 u

TAU_MOLAR_MASS = 1.90754e-3 kg mol^-1
U_TAU_MOLAR_MASS = 0.00013e-3 kg mol^-1

TAU_MUON_MASS_RATIO = 16.8170e0
U_TAU_MUON_MASS_RATIO = 0.0011e0

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TAU_NEUTRON_MASS_RATIO = 1.89115e0
U_TAU_NEUTRON_MASS_RATIO = 0.00013e0

TAU_PROTON_MASS_RATIO = 1.89376e0
U_TAU_PROTON_MASS_RATIO = 0.00013e0

THOMSON_CROSS_SECTION = 6.6524587321e-29 m^2
U_THOMSON_CROSS_SECTION = 0.0000000060e-29 m^2

TRITON_ELECTRON_MASS_RATIO = 5496.92153573e0
U_TRITON_ELECTRON_MASS_RATIO = 0.00000027e0

TRITON_G_FACTOR = 5.957924931e0
U_TRITON_G_FACTOR = 0.00000012e0

TRITON_MAG__MOM = 1.5046095202e-26 J T^-1
U_TRITON_MAG__MOM = 0.000000030e-26 J T^-1

TRITON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 1.6223936651e-3
U_TRITON_MAG__MOM__TO_BOHR_MAGNETON_RATIO = 0.000000032e-3

TRITON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 2.9789624656e0
U_TRITON_MAG__MOM__TO_NUCLEAR_MAGNETON_RATIO = 0.000000059e0

TRITON_MASS = 5.0073567446e-27 kg
U_TRITON_MASS = 0.000000015e-27 kg

TRITON_MASS_ENERGY_EQUIVALENT = 4.5003878060e-10 J
U_TRITON_MASS_ENERGY_EQUIVALENT = 0.000000014e-10 J

TRITON_MASS_ENERGY_EQUIVALENT_IN_MEV = 2808.92113298e0 MeV
U_TRITON_MASS_ENERGY_EQUIVALENT_IN_MEV = 0.00000085e0 MeV

TRITON_MASS_IN_U = 3.01550071621e0 u
U_TRITON_MASS_IN_U = 0.000000012e0 u

TRITON_MOLAR_MASS = 3.01550071517e-3 kg mol^-1
U_TRITON_MOLAR_MASS = 0.0000000092e-3 kg mol^-1

TRITON_PROTON_MASS_RATIO = 2.99371703414e0
U_TRITON_PROTON_MASS_RATIO = 0.000000015e0

TRITON_RELATIVE_ATOMIC_MASS = 3.01550071621e0
U_TRITON_RELATIVE_ATOMIC_MASS = 0.000000012e0

TRITON_TO_PROTON_MAG__MOM__RATIO = 1.0666399191e0
U_TRITON_TO_PROTON_MAG__MOM__RATIO = 0.000000021e0

UNIFIED_ATOMIC_MASS_UNIT = 1.66053906660e-27 kg
U_UNIFIED_ATOMIC_MASS_UNIT = 0.0000000050e-27 kg

VACUUM_ELECTRIC_PERMITTIVITY = 8.8541878128e-12 F m^-1
U_VACUUM_ELECTRIC_PERMITTIVITY = 0.000000013e-12 F m^-1

VACUUM_MAG__PERMEABILITY = 1.25663706212e-6 N A^-2
U_VACUUM_MAG__PERMEABILITY = 0.000000019e-6 N A^-2

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VON_KLITZING_CONSTANT = 25812.80745e0 ohm
U_VON_KLITZING_CONSTANT = 0.0e0 ohm

WEAK_MIXING_ANGLE = 0.22290e0
U_WEAK_MIXING_ANGLE = 0.00030e0

WIEN_FREQUENCY_DISPLACEMENT_LAW_CONSTANT = 5.878925757e10 Hz K-1
U_WIEN_FREQUENCY_DISPLACEMENT_LAW_CONSTANT = 0.0e0 Hz K-1

WIEN_WAVELENGTH_DISPLACEMENT_LAW_CONSTANT = 2.897771955e-3 m K
U_WIEN_WAVELENGTH_DISPLACEMENT_LAW_CONSTANT = 0.0e0 m K

W_TO_Z_MASS_RATIO = 0.88153e0
U_W_TO_Z_MASS_RATIO = 0.00017e0
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3.2 pycodata

All constant as declared in the *codata* are inserted at the top level of the module.

INDICES AND TABLES

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