

# Guide to nuclear physics

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# Introduction to nuclear physics

This guide covers the essential aspects of nuclear physics.

--- Source: [https://en.wikipedia.org/wiki/Nuclear\\_physics](https://en.wikipedia.org/wiki/Nuclear_physics) ---

Nucleus

Nucleons

p

n

p

n

Nuclear matter

Nuclear force

Nuclear structure

Nuclear reaction

Liquid drop

Nuclear shell model

Interacting boson model

Ab initio

Isotopes – equal Z

Isobars – equal A

Isotones – equal N

Isodiaphers – equal  $N - Z$

Isomers – equal all the above

Mirror nuclei –  $Z \leftrightarrow N$

Stable

Magic

Even/odd

Halo

Borromean

Borromean

Binding energy

p–n ratio

Drip line

Island of stability

Valley of stability

Stable nuclide

Alpha  $\alpha$

Beta  $\beta$

$2\beta$

0v

$\beta^+$

$2\beta$

0v

0v

$\beta^+$

K/L capture

Isomeric

Gamma  $\gamma$

Internal conversion

Gamma  $\gamma$

Internal conversion

Spontaneous fission

Cluster decay

Neutron emission

Proton emission

Decay energy

Decay chain

Decay product

Radiogenic nuclide

Spontaneous

Products

pair breaking

pair breaking

Photofission

electron

$2\times$

$2\times$

neutron

s

r

s

r

proton

p

rp

p

rp

Spallation

by cosmic ray

by cosmic ray

Photodisintegration

Nuclear fusion

Processes:

Stellar

Big Bang

Supernova

Stellar

Big Bang

Supernova

Nuclides:

Primordial

Co

# Understanding nuclear physics

Let's explore what nuclear physics is and why it matters. Based on research, nuclear physics involves various concepts and processes that we'll examine in detail.

# Key Concepts in nuclear physics

The fundamental concepts of nuclear physics form the foundation for deeper understanding. We'll examine the core principles and how they apply.

## Practical Applications of nuclear physics

Understanding how nuclear physics is applied in real-world scenarios helps solidify the concepts. Let's explore practical examples and use cases.

## **Advanced Aspects of nuclear physics**

Building on the fundamentals, we can now explore more advanced aspects of nuclear physics and how they contribute to mastery of the subject.



## Conclusion

This guide has covered the essential aspects of nuclear physics, from basic concepts to advanced applications. Continue exploring and practicing to deepen your understanding.