



# Nuclear effects in atomic transitions

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Atomic electrons are sensitive to the properties of the nucleus they are bound to, such as nuclear mass, charge distribution, spin, magnetization distribution, or even excited level scheme. These nuclear parameters are reflected in the atomic transition energies. A very precise determination of atomic spectra may thus reveal information about the nucleus, otherwise hardly accessible via nuclear physics experiments. This work reviews theoretical and experimental aspects of the nuclear effects that can be identified in atomic structure data. An introduction to the theory of isotope shifts and hyperfine splitting of atomic spectra is given, together with an overview of the typical experimental techniques used in high-precision atomic spectroscopy. More exotic effects at the borderline between atomic and nuclear physics, such as parity violation in atomic transitions due to the weak interaction, or nuclear polarization and nuclear excitation by electron capture, are also addressed.

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