DNP17-2017-000546

Abstract for an Invited Paper
for the DNP17 Meeting of
the American Physical Society

An MRI Scan of the nucleus[1]

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In the pursuit of a global description of nuclei, extensive experimental studies on short-lived isotopes have provided a wealth of new empirical information. Such data has been used to test theoretical concepts and in the development of innovative ideas. More directly, a novel device at Argonne National Laboratory, the HELIcal Orbit Spectrometer (HELIOS), was focused on providing detailed single-particle information on the malleability of the nuclear magic numbers. Once thought as immovable pillars in nuclear structure, the shell-gaps in nuclei defining magic numbers of nucleons are now well-known to evolve as proton-to-neutron ratios change. And, determination of the underlying components of the nuclear force driving the evolution is at the forefront of nuclear structure research. Additionally, the HELIOS device mentioned above also carries its own aura being that it is formed by a decommissioned MRI solenoid magnet. In this talk recent highlights and advancements in our description of nuclear shell evolution will be the focus along with a few sidestepping comments on the life-cycle and interplay between basic research and the applications of nuclear physics.

[1]This material is based upon work supported by the U.S. Department of Energy, Office of Science, under Contract Number DE-AC02-06CH11357.