Shell evolution and isomers below ^{132}Sn: Spectroscopy of neutron-rich $_{46}$Pd and $_{47}$Ag isotopes

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The shell structures of atomic nuclei are nowadays known to change with the variation of the proton or neutron number, due predominantly to the monopole part of the proton-neutron interaction that includes the central and tensor forces [1]. Such a shell evolutionary behavior is expected to become pronounced when the proton-neutron imbalance is very large, leading to lost or new magic numbers [2]: For example, the conventional magic numbers N = 8, 20, and 28 disappear and the new magicity emerges at N = 16, 32, and 34, depending on the location of the nucleus in the N-Z plane. However, we don't know yet whether similar change of the shell structure can take place at the heavier conventional magic numbers N = 50, 82, and 126, which also play an important role in determining the solar abundance distribution particularly around the three prominent peaks at A ≈ 80, 130, and 195, respectively, that would result from the rapid neutron-capture (r) process.

The neutron-rich isotopes of Pd (Z = 46) and Ag (Z = 47) have attracted considerable interest in terms of the evolution of the N = 82 shell closure and its influence on the r-process nucleosynthesis. Such previously unreachable exotic nuclides have become accessible by means of in-flight fission of a high-intensity ^{238}U beam available at a new-generation RI-beam facility, the RI-Beam Factory (RIBF) in RIKEN Nishina Center [3]. In this presentation, recent spectroscopic results of Pd and Ag isotopes obtained as part of the EURICA (EUROBALL-RIKEN Cluster Array) project at RIBF [4] will be presented, with a particular focus on characteristic isomers, such as a seniority isomer in $^{128}Pd_{82}$ [5], long-lived high-spin isomers in $^{126}Pd_{80}$ [6] and $^{127}Ag_{80}$, isomers with proton-hole and neutron-hole excitations in $^{125,127}Pd_{79,81}$ [7], and low-lying β-emitting isomers in $^{123,125}Ag_{76,78}$ [8]. The nature of these isomers will be discussed in terms of the effect of proton-neutron interactions and the resultant shell evolution below the doubly magic nucleus ^{132}Sn in the framework of shell-model approaches.

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