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Exploring the proton and neutron shell evolution in the “South-west” of doubly magic 132Sn

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The monopole-driven shell evolution has been revealed in the south of doubly magic ^{132}Sn for both neutron and proton shells. From the neutron shell side, an inversion of the $3/2^+$ and $11/2^-$ state, which corresponds to the neutron $d_{3/2}$ and $h_{11/2}$ orbitals, respectively, from $^{131}Sn_{81}$ to $^{129}Cd_{81}$, has been discovered in a recent mass measurement. According to the trend, the splitting between neutron $d_{3/2}$ and $h_{11/2}$ orbitals is getting larger from ^{129}Cd$_{81}$ to ^{127}Pd$_{81}$ where the $3/2^+$ state has not been discovered yet. From the proton shell side, a reduction of Z = 40 sub-shell gap, which is formed by proton $p_{1/2}$ and $g_{9/2}$ orbitals, was suggested at N = 82 in Ag isotopes by an extrapolation from the last known data point at ^{125}Ag. The $1/2^-$ state has not been discovered yet in ^{127}Ag. According to the systematics, long-lived beta isomers $3/2^+$ and $11/2^-$ are expected in ^{127}Pd and $1/2^-$ and $9/2^+$ are expected in ^{127}Ag. By establishing the beta-decay level scheme through the ^{127}Pd $\rightarrow$ ^{127}Ag $\rightarrow$ ^{127}Cd decay chain, combined with possible mass measurements using MR-TOF-MS, we can assess whether a significant change occurs in the proton subshell gap and neutron major shell gap in this region.

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