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Building a coherent physics picture around N=50 towards 78Ni

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The N=50 shell closure above ^{78}Ni has been the subject of intense experimental efforts. While an initial spectroscopy of ^{78}Ni itself has been achieved, the rich phenomenology around the neutron shell closure still lacks a comprehensive picture. The parabolic behaviour of the N=50 gap, decreasing from Z=40 to Z=32 and the re-increasing towards Z=30 is not well understood, also in terms of its relation with the appearance of low-lying shape-coexisting states in Se, Ge and Zn isotopes. Similarly, the rapid decreasing of the $\nu s_{1/2}$ shell, becoming almost degenerate with the $\nu d_{5/2}$ orbital, may have a role in the predicted and observed low-lying E1 strength in ^{83}Ge.
Recent experimental results will be presented, concentrating at first on N=50 core-breaking states and then on evidences of shape coexistence and triaxiality in the region coming both from in-beam and decay spectroscopy. Results will discussed in the framework of shell-model, mean filed, and weak coupling calculations, pointing out the evolution of neutron effective single-particle energies beyond N=50. It will be shown how heavy-meson exchange may provide a common physics picture to these phenomena. The relation to the possible development of a neutron skin beyond N=50, and hence to the appearance of a pygmy dipole resonance, will also be highlighted.
Future perspectives at new generation ISOL facilities will be addressed.

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