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Measuring the strength of the proton d5/2 - neutron d3/2 tensor-monopole interaction

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The replacement of the N=20 spherical shell gap in nuclei of the island of inversion by the N=14,16 gaps can be explained by the tensor monopole interaction between the proton and neutron Fermi levels. The next step in understanding the evolution of shell structure is to measure the strengh of this interaction, which is present throughout the nuclear chart. The ideal tool for this are transfer reactions where single-particle energies and spectroscopic factors can be extracted. Hence it is our aim to measure the neutron d3/2 strength function in nuclei where protons are gradually filling the d5/2 state (oxygen, neon, magnesium and silicon) by (d,p) reactions in inverse kinematics. Part of this program could be done at Rex-Isolde once the energy upgrade to 5 MeV/u is in place.

Author: FRANCHOO, Serge (Institut de Physique Nucleaire (IPN))

Presenter: FRANCHOO, Serge (Institut de Physique Nucleaire (IPN))

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