The 'island of inversion' from the nuclear moments perspective.

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In the past years, we have focused our research on a systematic study of the ground state magnetic moments of nuclides near and inside the island of inversion around ^{32}Mg. Through the nuclear g-factor, the magnetic moment is sensitive to the single particle configuration of the valence particles, and thus a good probe to identify the configuration of the odd particles in the ground state wave function. Precision measurements of nuclear g-factors allow to deduce information on the mixing between 'normal' and 'intruder' configurations in the ground state wave function, as demonstrated e.g. by Utsuno et al. [1] for the moments of neutron-rich Na isotopes (Z=11) [2].
In this talk, we will present recent results on the magnetic moments of neutron rich ^{27,29,31,33}Mg isotopes (Z=12) which were obtained from β-NMR and hyperfine structure measurements on laser-polarized beams, provided by the COLLAPS set-up at ISOLDE-CERN. The most remarkable result is the ground state spin/parity assignment for the N=19 nucleus ^{31}Mg, to be $I^{\pi}=1/2^{+}$ [3]. In combination with previous and recent β-spectroscopy studies [4,5], this has lead to the assignment of spins and parities for the 3 lowest excited states. Comparison with large-scale shell model calculations shows that the $1/2^{+}$ ground state is a *2p-2h* intruder state, and also the 3 lowest excited states are of *2p-2h* or *1p-1h* intruder nature.
The g-factors of neutron rich ^{31,32,33,34}Al and ^{35}Si isotopes have been measured at the LISE fragment separator of GANIL using spin-polarized fragment beams from projectile fragmentation and neutron pick-up reactions [6]. The influence of *2p-2h* intruder configurations in the ground state wave function as a function of Z, going from normal deformed Si isotopes to the well-deformed Mg isotopes is observed by comparing the experimental and calculated g-factors using different model spaces [7].
All results will be discussed in terms of large-scale shell model calculations, with the aim to identify the borders of 'island of inversion' in N and Z.

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