Structure around the island of inversion with single-neutron knockout reactions at GANIL

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The so-called "island of inversion" region of the nuclear chart, where transitions from normal to intruder ground state configurations across the $N = 20$ shell gap occur, has been of great interest in nuclear structure studies. Over the last decade, many experimental [1–4] and theoretical efforts [10,11] have been made along the Z=12 chain, which provide evidence that ^{31}Mg lies inside the "island of inversion" whereas ^{30}Mg and ^{29}Mg are outside the region. The study of the single-neutron knockout reaction of ^{31}Mg is a very interesting case since it is in the region where dramatic changes in the single-particle structure have been predicted. Indeed, ^{31}Mg is the only magnesium isotope between the normal, *sd* shell dominated configuration of ^{30}Mg, and the onset of the island of inversion at $N = 19$, reflecting a rather abrupt border. In spite of extensive studies on this nucleus [1–3] there are still some open questions regarding the amount of mixing of the different N$\hbar\omega$ configurations. The spectroscopic factors of the populated negative and positive parity states will allow to quantify the extent of the intruder admixtures. These results are important to refine the residual interaction within shell model calculations.

The ground state configuration of ^{31}Mg nucleus has been studied using the one-neutron knockout reaction ^{12}C(^{31}Mg,^{30}Mg+γ)X. We report on the preliminary results of an experiment performed with the EXOGAM array coupled to the SPEG spectrometer at GANIL. Exclusive cross sections and longitudinal momentum distributions for the measured bound states will be presented. These results are compared to shell model calculations in the *sd-pf* region.

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