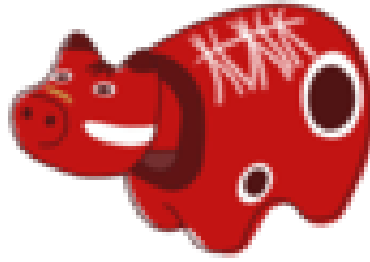


Single-particle and collective motions from nuclear many-body correlation (PCM2025)



Contribution ID: 51

Type: not specified

Structure within the $N=40$ Island of Inversion

The focus of this work is neutron-rich Fe and Mn isotopes with $N=40$, which lie within an Island of Inversion approximately centered at ^{64}Cr . Here, a quenching of the $N=40$ sub-shell gap allows multi-particle multi-hole excitations and deformation to develop in the ground-state configurations of nuclei in the region. Limited spectroscopic information has been collected so far in the region of $N=40$ below ^{68}Ni . For the even-even nuclei, the 2^+ and 4^+ state energy systematics has been explored and, for the Fe and Cr isotopes, of $B(E2; 2^+ \rightarrow 0^+)$ values have been measured up to ^{68}Fe and ^{64}Cr . Large-scale shell model (LSSM) calculations well reproduce the energy systematics of the observed low-lying states of the even-even Fe and Cr isotopes around $N=40$. However, spectroscopic factor and more complete level scheme predictions in the region have not yet been benchmarked by experimental results.

Proton knockout reactions on the neutron-rich $N=38$ and $N=40$ isotopes $^{64,66}\text{Fe}$ and $^{63,65}\text{Mn}$ have been performed to investigate the proton spectroscopic factors of the parent nuclei. We will discuss the results of this measurement as well as a complementary secondary fragmentation measurement, and interpret in comparison with both LSSM and Nilsson model calculations.

Type of contribution

Are you a student or postdoc?

no

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