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Evolution of collectivity in exotic isotopes[1]

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Neutron-rich nuclei have been the subject of much recent investigations. From the recent studies, the weakening of the N=40 shell gap is ascribed to the strong interaction between nucleons in the πpf and the νg9/2 and νd5/2 orbitals, which induces energy shifts of the single-particle states, thereby leading to an increased collectivity in neutron-rich nuclei beyond and below the $^{68}Ni_{40}$ core. Studies in this context of selected neutron-rich nuclei will be conducted extensively at ATLAS with Gammasphere or GRETINA using reactions well above the Coulomb barrier. A number such experiments have demonstrated that the yrast states of hard-to-reach neutron-rich nuclei can be populated allowing experimental access to high-spin structures in regions inaccessible with conventional heavy-ion induced, fusion-evaporation reactions.

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