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Shape Co-existence in Cr and Fe Isotopes Near N=40[1] M.P. CARPENTER, R.V.F. JANSSENS, S. ZHU, Argonne National Laboratory — New data on the low- spin structure of neutron-rich Cr and Fe isotopes show a compression of the first $2^+$and 4^+ excitation energies relative to the lighter isotopes, suggesting the onset of collectivity associated with deformation. B(E2) values measured using Coulomb excitation and state lifetimes measured with a differential plunger also show an increase in collectivity as one approaches N=40 for the Fe and Cr isotopic chains. Recent shell- model calculations are able to reproduce the measured yrast level structure by including both $g_{9/2}$ and $d_{5/2}$ orbitals, which lie above the N=40 shell gap, in the model space of the calculations. Utilizing fusion evaporation reactions and Gammasphere, we have identified a number of rotational bands at high -spins in some of the lighter Cr and Fe isotopes. In addition, the moments of inertia associated with these bands, while all very similar, are dissimilar to the moments of inertia extracted for the ground state bands in the heavier Fe and Cr isotopes. This suggests that while the heavier isotopes display collectivity at low spin and excitation energy, mixing between the deformed states and the shell- model states distorts the deduced moments of inertia. In order to test this hypothesis, we have performed simple two-band mixing calculations assuming that the yrast bands of these neutron-rich Cr and Fe even-even isotopes result from mixing between spherical and deformed states. The results of these band mixing calculations will be presented.

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