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Structure of neutron-rich neon and magnesium isotopes

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Atomic nuclei have good spin, parity, and third component of the isospin. Yet for many nuclei, symmetry unrestricted mean-field calculations find it advantageous to break rotational invariance and particle number conservation such that the vacuum states accurately reflect the emergent symmetry breaking of intrinsically deformed and superfluid nuclei. Starting from such symmetry-breaking mean-field states in nuclear structure computations has the advantage that less effort needs to be spent in including correlations beyond the mean field; the disadvantage consists in the need to perform symmetry projections. In this talk I will present calculations for even-even neon and magnesium isotopes starting from chiral nucleon-nucleon and three-nucleon forces. I will discuss the restoration of broken rotational symmetry in coupled-cluster calculations, and present results for the rotational structure in these isotopic chains. In particular we predict that neutron-rich 34-Ne is as rotational as 32-Ne and 34-Mg.

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