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Title: **Symmetries of the rotating mean field**

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The cranking model, which provides uniformly rotating mean field solutions, is the standard microscopic description of high spin states. The existence and structure of rotational bands reflects the symmetries of these solutions. The relation between angular momentum $\vec{J}$ and velocity $\vec{\omega}$ is much more complex than for molecules or liquids, because nuclei are composed of nucleons on orbits with an angular momentum, which is largely controlled by quantization.

The currents of these orbitals are the elements of anisotropy, which break the symmetry of the mean field with respect to $\vec{J}$, thus giving rise to rotational bands. The existence of magnetic rotation demonstrates that substantial anisotropy of the current distribution may occur for a nearly isotropic density distribution.

The nucleonic currents combine to a flow pattern that is different from rigid body flow when the pair correlations are quenched. This is clearly the case for bands in weakly deformed nuclei, but the moments of inertia of well deformed nuclei deviate from the rigid body value too, which is only approached in superdeformed nuclei.

The combination of $\vec{J}$ with the density distribution gives rise to a variety of discrete symmetries. A new possibility is the breaking of chiral symmetry in triaxial reflection symmetric nuclei. It shows up as a pair of identical $\Delta I = 1$ bands of the same parity. Mean field solutions of this type have been found in nuclides around $A = 134$, where there is experimental evidence for a small island of chirality

There are 15 different discrete symmetries of the rotating mean field if time odd components are considered and no reflection asymmetry is demanded. Some of them have a spin parity sequence that is distinctly different from the familiar ones, which would be a clear experimental signature of the symmetry. So far there is only evidence for the symmetries leading to the spin parity sequences: $I^+, (I+2)^+, (I+4)^+, ...,$ $I^+, (I+1)^+, (I+2)^+, ...,$ $2I^+, 2(I+1)^+, 2(I+2)^+, ...$ (chiral doubling), $I^+, (I+1)^-, (I+2)^+, ...,$ and $I^\pm, (I+1)^\pm, (I+2)^\pm, ...$ (parity doubling).

Invited talk.