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Microscopic description of fission fragment spin formation during and after fission

One source of spin of the fragments during the fission process is the induction of a rotation at and after scission. Due to the small initial angle between the deformed fragment and the fission axis, the nuclear and Coulomb interaction creates a torque leading to a rotation of the fragments. The time-dependent Hartree-Fock theory is used to microscopically study this angular momentum generation, starting with different initial configurations. The angular momentum generated by the Coulomb interaction after scission is mainly collective, while this is not the case for the spin build at scission. To understand the generation of angular momenta, the collective potential at scission is determined using the Frozen Hartree-Fock method. The competition between rotational modes (bending, wriggling, and twisting) is discussed and shows that the twisting mode is less populated than the bending and wriggling mode.

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