

Numerical simulations for the precession dynamo experiment in the framework of the DRESDYN project

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In a next generation dynamo experiment currently under development at Helmholtz-Zentrum Dresden-Rossendorf (HZDR) a fluid flow of liquid sodium, solely driven by precession, will be considered as a possible source for magnetic field generation.

I will present results from hydrodynamic simulations of a precession driven flow in cylindrical geometry. In a second step, the velocity fields obtained from the hydrodynamic simulations have been applied to a kinematic solver for the magnetic induction equation in order to determine whether a precession driven flow will be capable to drive a dynamo at experimental conditions.

It turns out that excitation of dynamo action in a precessing cylinder at moderate precession rates is difficult, and future dynamo simulations are required in more extreme parameter regimes where a more complex fluid flow is observed in water experiments which is supposed to be beneficial for dynamo action.
