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Finite Volume simulations of dynamos in ellipsoidal planets

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So far numerical simulations have mostly considered buoyancy as the driving mechanism of the dynamo-process. But also precession can drive the dynamo, as first suggested by Bullard in 1949. We investigate the properties of precession-driven planetary dynamos by the use of a Finite Volume code. In planets it is much more effective to drive a precessional flow by the pressure differences induced by the topography of the precessing body rather than by viscous coupling to the walls.

Numerical simulations are the only method offering the possibility to investigate the influence of the topography since laboratory experiments normally are constrained by the predetermined geometry of the vessel. We shall discuss how the ellipticity of the planets can be included in our simulations by the use of a non orthogonal grid. Here we will present some first results.We show that laminar precession driven flows can drive kinematic dynamos.