A004-03 **会場: D** **時間: 11月4日 14:10-14:25**

Interplay between large-scale flows and sheet plumes in spherical shell dynamo

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Mechanisms of magnetic field intensification by flows of an electrically conducting fluid in a rapidly rotating spherical shell are investigated. Bearing dynamos of the Earth and planets in mind, the Ekman number is set at $\$10^{-5}\$$. A strong dipolar solution with magnetic energy 55 times larger than the kinetic energy of thermal convection is obtained. In a regime of sufficiently small viscous and inertial forces with the strong magnetic field, convection structure consists of a few large-scale retrograde flows and sporadic thin sheet-like plumes induced beneath the core-mantle boundary. The magnetic field is amplified through stretching of magnetic lines, which occurs typically through three distinct types of flow: the retrograde flow near the outer boundary, the downwelling flow associated with sheet plumes, and the prograde flow near the rim of the tangent cylinder. The magnetic fields intensified by the first and second types of the flow are accompanied by current loops, whereas the current sheet in the axial direction appears corresponding to the third one. These structures are different from ones observed for dynamos at both larger and smaller Ekman numbers, because of weaker effects of viscosity and inertia, and of stronger effects of the magnetic field on dynamics of convection in the low-Ekman number regime.