惑星ダイナモにおける時間スケール

＃桜庭 中 [1]
[1] 東京大・理・地球惑星

Timescales in planetary dynamo process

Ataru Sakuraba[1]
[1] Dept. of Earth and Planetary Science, Univ. of Tokyo

In the previous 2019 Jpgu Meeting we presented recent results of kinematic dynamo calculations and pointed out importance of linear magnetic field growth rates of kinematic dynamo and magnetic instability in the process of nonlinear planetary dynamos. Considering a simple two-scale model consisting of an axisymmetric (A) field and a non-axisymmetric (N) field of azimuthal wavenumber m, we gave an idea that the energy transfer rates between these two scales might determine the magnetic field saturation. The A- and N-fields are both created a (kinematic) dynamo process, while a part of the A-field energy is transferred to the N-field energy due to magnetic instability in which an axisymmetric toroidal field is destabilized when the intensity exceeds a certain critical value. Two timescales, kinematic dynamo and magnetic instability, can be roughly obtained by linear models, so there is a possibility to estimate a relation between the A-field intensity, flow speed that creates magnetic field, and length scale (m). In this presentation, we show results of further investigation and discuss the availability.