Geophysical Research Abstracts,
Vol. 11, EGU2009-3076, 2009
EGU General Assembly 2009

Concerning the Initial Temporal Evolution of a Hermean Feedback Dynamo

D. Heyner (1), K.-H. Glassmeier (1), D. Schmitt (2), U. Motschmann (3), and J. Wicht (2)

(1) TU Braunschweig, Institut für Geophysik und extraterrestrische Physik, Braunschweig, Germany (d.heyner@tu-bs.de), (2) Max-Planck-Institute for Solar System Research, Katlenburg-Lindau, Germany, (3) Institute for Theoretical Physics, TU Braunschweig, Braunschweig, Germany

Various possibilities are currently under discussion explaining the observed weakness of the intrinsic magnetic field of planet Mercury. One of the possible dynamo scenarios is a dynamo with feedback from the magnetosphere. Due to its weak planetary magnetic field, Mercury exhibits a small magnetosphere whose sub-solar magnetopause distance is only about 1.7 Hermean radii. Hence, the magnetic field due to magnetopause currents cannot be disregarded in the dynamo region. Since the external field of magnetospheric origin is antiparallel to the dipole component of the dynamo field, a negative feedback results. For a simple $\alpha\Omega$ - dynamo two stationary solutions of such a feedback dynamo emerge, one with a weak and another with a strong magnetic field. The question, however, is how these two stationary solutions can be realized. To address this problem, we discuss various dynamic scenarios for simple dynamo models and the conditions under which either of the stationary situations evolves.