

Abstract Submitted
for the DPP12 Meeting of
The American Physical Society

Asymmetric Solutions of the Grad-Shafranov Equation MATSAK AINOV, ALEXANDER MUSTAFAEV, National Mineral Resources University (University of Mines) St-Petersburg, VLADIMIR SEMENOV, St-Petersburg State University — Grad-Shafranov (GS) equation describes the kinetic equilibrium of plasma embedded into magnetic field, in particular the space current sheets. GS equation can be derived from the Vlasov equations with self-consistent electromagnetic field. It is known (Walker, 1915), that the exact solutions of the GS equation can be obtained by use of a special complex function $g(\xi)$ which is responsible for the current sheet structure. Up to now were known only symmetric solutions which are not enough to describe the structure of the real space current layers. For example, the symmetric current sheet in the Earth's magnetotail happens to be only twice per year during the spring and autumn equinox. Therefore it was suggested to extend the well-known classes of the exact kinetic solutions (Harris, Fadeev, Kan and Manankova) of the GS equation for the asymmetric current sheet configurations by use the appropriate complex Walker function $g(\xi)$. As a result a new class of asymmetric kinetic current sheet equilibrium has been obtained and investigated.

Matsak Ainov
National Mineral Resources University (University of Mines) St-Petersburg

Date submitted: 06 Sep 2012

Electronic form version 1.4