Study of Shafranov shift by the simplest Grad-Shafranov equation solution for HT-7 superconducting Tokamak

M. Asif

Department of Physics, COMSATS Institute of Information Technology, Lahore 54000, Pakistan

Abstract

Plasma internal energy is not conserved on a magnetic surface if nonlinear flows are considered. The magnetohydrodynamic equilibrium in an axisymmetric plasma is described by the Grad-Shafranov equation in terms of the magnetic flux. A generalized Grad-Shafranov-type equation has been derived. Specific functional forms of plasma internal energy and current are used. A simplest analytical solution of the Grad-Shafranov equation is presented. This solution is over constrained both in shape and in plasma current. We demonstrate that the Shafranov shift for this solution is independent of plasma current on HT-7 superconducting Tokamak.