Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

Bootstrap current calculations for TJ-II stellarator[1] JULIO J. MARTINELL, KATIA CAMACHO, ICN-UNAM — Bootstrap current is stellarators is usually very small since they operate solely with the magnetic confinement provided by the external currents. Since plasma pressure gradients are always present the bootstrap current is always finite, but the magnetic design can be optimized to minimize it. In the helias configuration there is no optimization and therefore it is important to estimate the actual bootstrap current generated by given pressure profiles. Here, we use the configuration of the TJ-II helias to calculate the bootstrap current for various density regimes using the kinetic code DKES. We compute the monoenergetic transport coefficients D_{11} and D_{13} to find first the thermal ambipolar diffusion coefficients and the corresponding radial electric field and then the respective bootstrap current. This is made taking experimental density and electron and ion temperature profiles. In spite of the convergence problems of DKES at low collisionality, we can obtain bootstrap current values with acceptable uncertainties, without using Monte Carlo methods. The results are compared with axisymmetric neoclassical computations. The resulting rotational transform is used to obtain the rational surfaces location and predict the transport barriers observed in the experiments.

[1]Funded by projects PAPIIT IN109115 and Conacyt 152905

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Date submitted: 14 Jul 2016 Electronic form version 1.4