Abstract Submitted
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Radial electric field computations with DKES and neoclassical models in TJ-II stellarator[1] JULIO MARTINELL, Universidad Nacional Autonoma de Mexico, CESAR GUTIERREZ-TAPIA, Instituto Nacional de Investigaciones Nucleares, DANIEL LOPEZ-BRUNA, Laboratorio Nacional de Fusion, CIEMAT — Radial electric fields arise due to the non-ambipolar transport in stellarator plasmas and play an important role in determining some improved confinement regimes. In order to calculate this electric field it is necessary to take all particle fluxes that are not ambipolar. The most important contribution to these fluxes comes from neoclassical transport. Here we use particle fluxes obtained from kinetic equation computations using the code DKES to evaluate the radial electric field profiles for certain discharges of the heliac TJ-II. Experimental profiles for the density and temperatures are used together with the diffusion coefficients obtained with DKES. A similar computation of the electric field is performed with three analytical neoclassical models that use an approximation for the magnetic geometry. The ambipolar electric field from the models is compared with the one given by DKES and we find that they are all qualitatively similar. They are also compared with experimental measurements of the electric field obtained with HIBP. It is shown that, although the electric field is reasonably well reproduced by the neoclassical computations, especially in high temperature regimes, the particle fluxes are not. Thus, neoclassical theory provides good E_r estimates in TJ-II.

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