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Neoclassical impurity transport in stellarator geometry J.M. GARCÍA-REGAÑA, C.D. BEIDLER, R. KLEIBER, Y. TURKIN, H. MAAßBERG, P. HELANDER, K. KAUFFMANN, Max-Planck-Institut fuer Plasmaphysik, STELLARATORTHEORIE TEAM — The appearance of a (neoclassical) inward radial electric field in stellarators is known to cause, under certain plasma conditions, the accumulation of impurities in the core, and sometimes the subsequent plasma radiative collapse. Quantitatively neoclassical theory has barely covered the impurity transport due to the conventional neglect of the assumed first order electrostatic potential and density, Φ_1 and n_1 respectively, in the drift kinetic ordering. This practice, which ignores the fulfilment of the quasi-neutrality condition, carries intrinsically the assumption $Z|e|\Phi_1/k_{\rm B}T \ll 1$, with Z the atomic number, $|e|$ the unit charge, $k_{\rm B}$ the Boltzmann constant and T the temperature. This inequality, valid for the bulk plasma, is violated by high Z impurities. In this work the δf PIC Monte Carlo code EUTERPE [1] together with the GSRAKE code [2] are used to obtain the first numerical output of neoclassical impurity dynamics retaining Φ_1 and n_1 in the drift kinetic equation. The case of the LHD stellarator is considered.

[1] V. Kornilov *et al*, *Nucl. Fusion* **45** 238, 2005.
[2] D. Beidler and W. D. D'haeseleer, *Plasma Phys. Control. Fusion* **37** 463, 1995.

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