

Abstract Submitted
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Impurity expulsion in an RFP plasma and the role of temperature screening¹ S.T.A. KUMAR, D.J. DEN HARTOG, R.M. MAGEE, G. FIKSEL, Department of Physics, University of Wisconsin-Madison, USA, D. CRAIG, Wheaton College, Wheaton, IL, USA — In the improved confinement discharges of the Madison Symmetric Torus reversed field pinch, the density profile of C^{+6} , measured using Charge-Exchange Recombination Spectroscopy, is hollow. The core impurity density decays in time after the transition to improved confinement, concurrent with an increase of impurity density outside mid-radius, indicating an outward convection of impurities from the core of the plasma. Our analysis using neoclassical impurity transport theory shows that the observed hollow profile could possibly be explained by a mechanism known as “temperature screening,” where a thermal force due to a strong ion temperature gradient and high collisionality of C^{+6} ions expel impurities from the core of the plasma.

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