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Impurity dynamics in plasma turbulence: multiscale analysis, intermittency, and non-diffusive transport S. FUTATANI, CNRS-Universite de Provence, D. DEL-CASTILLO-NEGRETE, Oak Ridge National Laboratory, N. DUBUIT, CNRS-Universite de Provence, X. GARBET, Association Euratom-CEA, S. BENKADDA, CNRS-Universite de Provence — Impurity transport in tokamak plasmas is investigated using a three-dimensional fluid global code. The impurities are treated as an active scalar and the self-consistent interaction between the impurity concentration and the turbulence is studied in detail. A multiscale analysis based on proper orthogonal decomposition methods reveals that the impurity concentration gives rise to strong intermittency in the $\mathbf{E} \times \mathbf{B}$ flow and the ion temperature flux. The probability density functions of fluctuations exhibit a transition from Gaussian (for low Z impurities) to exponential (for high Z impurities). Spatio-temporal flux-gradient cross correlation functions are used to characterize the level of non-diffusive, non-local transport in the system.

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