

Abstract Submitted
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Evidence for Particle Inward Transport, Theoretical prediction and Importance for Reacting Plasmas¹ N. SHARKY, Retired, B. COPPI, MIT, C. MAZZOTTA, ENEA — The fact that particle transport cannot be described by a diffusion equation but by one [1,2] that would include an inflow term, involving transport in the direction of the density gradient, was evidenced by experiments on magnetically confined plasmas in which the central plasma density was observed to increase as a result of gas injection at the edge of the plasma column. The validity of the proposed equation has been repeatedly confirmed over the years and limitations for the occurrence of particle inflow in a variety of experimental conditions have been uncovered. The direct experimental observation of the inward propagating particle cloud leading to a profile peaking [3] is described and the effects of different degrees of density peaking in fusion burning plasmas are analyzed.

1. B. Coppi and C. Spight, Phys. Rev. Lett., 41, 551 (1978).
2. N. Sharky and B. Coppi, Nucl. Fus. 21, 1363 (1981).
3. C. Mazzotta et al., Proceedings of the 44th EPS Conference on Plasma Physics, Paper P2.179 (2017).

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