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## Experimental research on particle transport in Tokamak plasmas\*

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Tokamaks are currently the most well-developed and well-funded approach to fusion energy because a significant “net fusion power”, approaching  $QDT = 1$ , has been obtained in few tokamaks (JET, TFTR, JT-60U). The fusion triple product ( $nT\tau E$ ) required to overcome a threshold for scientific breakeven reached record levels in these experiments. Here  $n$ ,  $T$ , and  $\tau E$  are the ion density, ion temperature and energy confinement time respectively. However, tokamak plasmas are mainly subject to several important operational limiting parameters, two of which are density and beta. Based on one of these limiting parameters, we will report on how to control the plasma density, meanwhile a global image of the particle transport dynamics will be reported: including dynamics involved in spontaneous particle internal transport barrier formation (p-ITB) [1] and edge localized mode control that facilitates the long-time maintenance of the edge

transport barrier (ETB) using Supersonic Molecular Beam Injection (SMBI) [2] and Resonant Magnetic Perturbation (RMP) [3,4] fields.

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### References

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