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Determination of the System Function for the Particle Circulation Process Using Perturbation Technique in QUEST

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A new approach to realize steady state tokamak operation SSTO has been demonstrated in QUEST with all metal wall baked at 100°C. Using particle flux perturbations driven by particle source H₂ and plasma-wall interaction PWI the system functions of processes of retention and release into/from the wall are determined both in time and frequency domains. The system function for the particle circulation has been determined by perturbation technique and independent measurement of partial pressure and permeation flux. The temporal evolution of system function, especially very low frequency component, must be controlled in order to sustain the steady-state discharge.

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