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Long-pulse detached scenario by feedback N2 seeding on EAST

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For the long-pulse operation of the fusion rectors, the detachment phase is mandatory to protect the divertor from the overheating. The nitrogen-induced detachment has been widely applied but also been limited by its strong wall retention effect and the chemical activity. On EAST, under the ITER-like divertor, boron (B) coating and the long-pulse discharge conditions, N_{2} is firstly used to the feedback control of the divertor electron temperature (T_{e,div}) of 5eV and extends the detachment control time to about 60s, which is the longest record of the active detached plasma by the feedback control on EAST. The N_{2} seeding reduces the divertor heat flux, supressing the tungsten (W) sputtering and generates the local strong radiation near X-point. EAST also uses the clean discharge to remove the wall- retained N particles. The heating power of ECRH (P_{ECRH}) plays an important role in the N-removing, applying the clean discharge in the middle of a series of discharges is an effective way to apply the N_{2} seeding in the long-pulse operation of the detachment phase.

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