ABSTRACT

Deuterium-fueled radiative divertors, operating in the Partially Detached Divertor (PDD) regime, are effective in reducing heat loading on the divertor target. These PDD discharges are shown to be compatible with active particle exhaust conditions—an important issue for ITER-type operation. The measured global- and local plasma properties of actively pumped PDD discharges are also shown to have important similarities with non-pumped PDD discharges. Active particle exhaust leads to quasi-equilibrium plasma conditions in both the divertor and main body within several particle confinement times (*i.e.*, ~800 ms). However, changes in the gas puffing and/or pumping programs have an almost immediate impact on the divertor plasma (*e.g.*, the PDD regime ends ~50 ms after the injected deuterium gas flow is interrupted). In contrast to pumping results with lower density non-radiative divertor discharges, the divertor cryopump particle exhaust rate is relatively insensitive to the location of the divertor separatrix strike point during radiative divertor operation. ELMs are shown to trigger divertor MARFEs under slightly submarginal PDD conditions.