

Development of core plasma density feedback control necessary using fuelling pellets

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In long pulse experiments on ITER and DEMO, pellet injection will need to be used to fuel the core plasma and will likely be the sole actuator available for core density control. The reason is that gas injection will be largely ineffective due to its limited penetration depth towards the core. However, considering the expected 10% lost pellet rate during injection, feedback control will be vital to compensate for the lost pellets and retain or regain preferable density profiles. Moreover, the size of pellets plays a crucial role on the design of the feedback control strategy. This work outlines several challenges associated with pellet (feedback) control and shows some results from the first model predictive controller designed to do profile control with multiple pellet injectors.

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