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P2.1076 Integrated core transport modelling of multiple isotope pellet cycle at JET

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Due to the low gas puff fuelling efficiency in future reactors, pellets will be used to provide the necessary particle fuelling. Since the core isotope composition should be maintained and controlled at 50 : 50% D-T, it is important to understand and accurately model multiple-isotope particle transport, including during transient events such as pellets. Recent experiments at JET of Deuterium pellet fuelling in a pure Hydrogen plasma [1] has suggested a fast timescale for the Deuterium penetration in the core. This interpretation is in line with additional sets of multipleisotope experiments at JET, hinting that the ion particle transport coefficients in the ITG regime are significantly larger than those of electrons [2]. Such an interpretation is supported by recent analytical, nonlinear and quasilinear analysis [3], including the successful modelling of the multiple-isotope experiments [4].
This work directly models the mixed-isotope pellet fuelling experiment, through first-principlebased simulation of multiple pellet cycles. The quasilinear turbulent transport model QuaLiKiz [5], [6] and the pellet ablation model HPI2 are used within the JINTRAC integrated modelling suite [7]. The kinetic profiles and the Deuterium penetration timescale are successfully captured. The transport predictions of the quasilinear model in the presence of a negative density gradient are validated by comparison with linear GENE. This result has positive implications for the modelling of multi-isotope core fuelling and burn control.
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