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“NBI power loss mechanisms at ASDEX Upgrade under different plasma configurations “

Abstract:

The behaviour of the NBI power loss mechanisms changes adopting different magnetic configurations, i.e. in the case of opposite signs of the toroidal magnetic field and plasma current. To evaluate the energy confinement with sufficient accuracy, this has to be taken into account properly. The power losses have been evaluated on a large database of pseudo-discharges simulations made with TRANSP which scans several plasma parameters. Multiple regressions analysis of the beam losses have permitted to extend the old parametrisation in the conventional magnetic configuration and to provide a completely new one in the reversed magnetic configuration. The parametrization has been validated against simulations of real ASDEX Upgrade discharges and, given its robustness, routinely implemented in the plasma energy confinement calculation. Thus, for the first time at ASDEX Upgrade, it is now possible to accurately evaluate the energy confinement time for discharges in the reversed magnetic configuration. A first comparison of the confinement times in two similar discharges with opposite fields' sign will be presented.

