Predicted Toroidal Rotation Enhancement of Fusion Power Production in ITER

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Abstract

The toroidal rotation driven by negative neutral beam injection (NNBI) into the International Thermonuclear Experimental Reactor (ITER) is predicted using the GLF23 transport model. It is found that a significant gain in the fusion power output is achieved with reasonable levels of NNBI power. The increase in fusion power with co-injected NNBI is steeper than with balanced NNBI or pure electron heating. This is due to the toroidal rotation increasing the threshold gradient for the ion temperature gradient modes in the GLF23 model. The increase in fusion power is found to be weakly dependent on the NNBI voltage over a range of values from 250 keV to 1 MeV.

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