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Alpha particle loss studies in ITER with test blanket modules G.J. KRAMER, R.B. WHITE, R. NAZIKIAN, PPPL — Alpha particles in ITER should be confined well during the burn phase of the discharge and not lost due to the effects of magnetic field ripple. The toroidal field ripple in ITER is designed to be small, 0.2% or less with optimized feritic inserts. However, the insertion of three test blanket modules (TBMs) increases the field ripple quite substantially with a notable increase in the loss of fusion-born alpha particles, according to simulations performed with two particle orbit following codes ORBIT and SPIRAL. we have investigated the fusion-born alpha particle losses with and without the TBMs and found that the losses increase by a factor of two overall with a marked increase in the localization of the losses when the TBMs are present. The heat load on the first wall with optimized ripple (0.2%) and no TBMs is spread uniformly over the outer wall due to the 18-fold symmetry of the toroidal field coil set. In the simulations with the TBMs, three intense hot spots are obtained with heat loads up to 1 MW/m^2 in the center of the TBMs.

G.J. Kramer PPPL

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