Contribution ID: **3293** Type: **not specified**

# P2.1086 ASCOT-AFSI simulations of fusion products for the main operating scenarios in JT-60SA

*Tuesday, 9 July 2019 14:00 (2 hours)*

See full abstract here:
http://ocs.ciemat.es/EPS2019ABS/pdf/P2.1086.pdf

The JT-60SA is a large device with a plasma volume 50% larger than JET, and up to 34 MW of NBI heating power. High performance deuterium plasmas are expected to produce neutron rates in excess of 10^(17) n/s. A significant fraction of the fusion reactions will be produced by high-energy NBI ions from 24 MW positive (PNB) and 10 MW negative (NNB) neutral beam injectors with up to 500 keV energy. Additionally, tritons produced in the D-D reactions have a Larmor radius similar to that of fusion alphas, which are useful for improving the predictability of alpha particle behaviour in ITER and DEMO. High-fidelity simulations for both the fast ions as well as the fusion products are thus necessary. The fusion products are simulated with the calculation chain of BBNBI, ASCOT and AFSI codes. The beamlet-based NBI code BBNBI is used to calculate the fast ion source from the 85 keV PNB and 500 keV NNB injectors. The Monte Carlo orbit-following code ASCOT solves the slowing-down distribution function of the reactants, and the AFSI fusion source integrator is used to calculate the resulting fusion products for thermonuclear, beamthermal and beam-beam reactions. The D-D tritons can then be investigated with further ASCOT-AFSI simulations. In this contribution we present simulation results for fusion products in the planned main JT-60SA operating scenarios. Depending on the scenario, more than 75 % of the neutrons can originate from beam-thermal and beam-beam reactions, of which up to 80 % are produced by the 500 keV NNB ions. Furthermore, the neutron energy spectrum is significantly widened due to the high reactant energy. Estimates are also presented for the confinement of the tritons and the 14.1 MeV neutron rate due to the triton burn-up.

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**Session Classification:** Poster P2

**Track Classification:** MCF