Contribution ID: **111** Type: **Invited**

# Progress on non-linear MHD simulations of ITER Shattered Pellet Injection

The reliable operation of high performance tokamaks such as ITER necessitate efficient and robust Disruption Mitigation System (DMS), which in turn relies on a clear understanding of the interplay between injected materials and the magneto-hydrodynamic (MHD) modes, thus providing incentive for nonlinear 3D MHD modelling of disruption mitigation. In this report, we will present an overview of ITER Shattered Pellet Injection (SPI) simulations by JOREK, M3D-C1 and NIMROD.

The JOREK simulations focus on the MHD modes, the density transport and the radiation asymmetry under different injection configurations as well as different pellet species compositions with ITER L-mode scenarios. A two temperature model will be compared against the single temperature model to show the impact of electron-ion temperature deviation. The MHD response will be shown to be sensitive to the injection configuration, and also sensitive to the synchronization of the fragments in the case of multiple injections. Such sensitivity in MHD activity leads to the different density transport dynamics during the Thermal Quench (TQ). The impact to the radiation asymmetry would also be analysed for the aforementioned cases.

Apart from the aforementioned result, progress on initial ITER SPI simulations with M3D-C1 and their comparison to DIII-D and JET modeling will be presented. Furthermore, a review of past NIMROD ITER SPI simulations would be given to shed some light on the mitigation dynamics to be expected when we inject into a ITER H-mode high performance plasma.

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**Track Classification:** Mitigation