**Modelling neutral particle fluxes from fast ions in the JET tokamak**

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Neutral particle analysis (NPA) is a diagnostic method for measuring the energy spectrum of neutral particles emitted by a tokamak plasma, directly conveying information on the density and temperature of ions deep inside. This information in turn is crucial for efficient fusion reactor operation, where precise control of the ratio of different fuel isotopes is required.

The measured neutral particle spectra are, however, distorted by energetic particles such as those resulting from neutral beam injection (NBI) heating. The high-energy fluxes from the accelerated ions mask the signal from the bulk plasma. This hinders analysis of the main plasma ions, but at the same time provides an opportunity to diagnose the injected ions themselves.

In this work, the fast ion orbit following code ASCOT, together with other plasma codes available in the JET modelling suite, were used for predictive and interpretive modelling of the distribution and neutral flux of NBI ions in the JET tokamak. The NPA signal was found to be highly dependent on factors such as neutral particle distribution, plasma density and heating scheme, necessitating detailed numerical modelling.

[†]See the Appendix of F. Romanelli et al., Proceedings of the 25th IAEA Fusion Energy Conference 2014, Saint Petersburg, Russia.