

Scenario preparation for the observation of alpha-driven instabilities and transport of alpha particles in JET DT plasmas



- α -driven Toroidal Alfvén Eigenmodes (TAEs): potential issue for burning plasmas (e.g. in ITER). Unambiguously identified only in TFTR DT plasmas
- Preparation of a dedicated scenario to observe α -driven TAEs and the associated transport of alpha particles during upcoming JET DT campaign
- Development of pulses in recent JET deuterium campaigns include
 - Good fusion performance resulting from Internal Transport Barrier
 - Elevated q-profile
 - Real-time control-triggered afterglow at peak performance
 - NBI-only power before period of interest (afterglow)
 - ELM pacing by pellets
 - Core-localised TAEs when ICRH power used
- Pulses fully ready to be run in T and DT
- Extrapolations to DT from integrated modelling (TRANSP and CRONOS) yield $\beta_{\alpha}(0) \sim 0.15\%$, $\sim 9\text{MW}$ of fusion power - larger than values typical of DT extrapolations of previous JET pulses, and of TFTR experiment
- JET/TFTR comparisons included in plans for forthcoming JET DT campaign