



DE LA RECHERCHE À L'INDUSTRIE

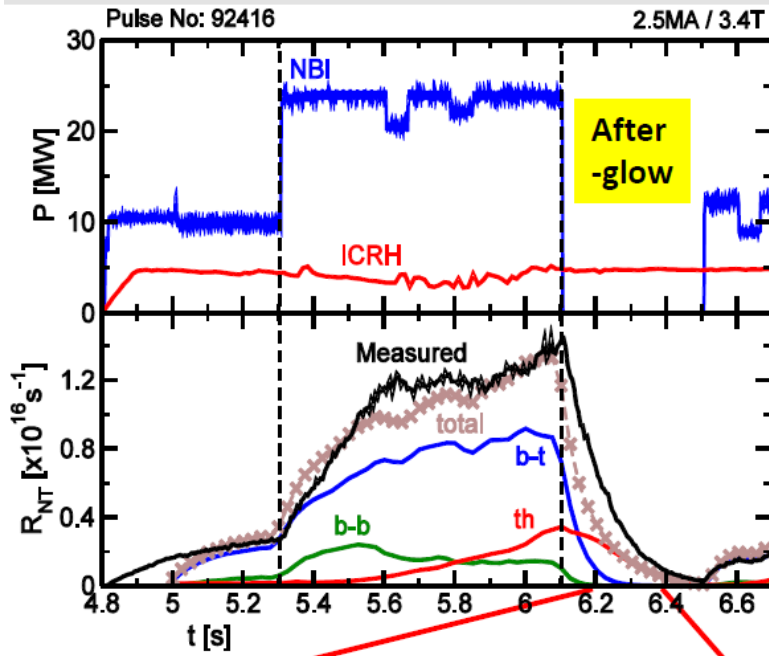
TSVV10 meeting #2 : JET DT preparation

09/07/2021

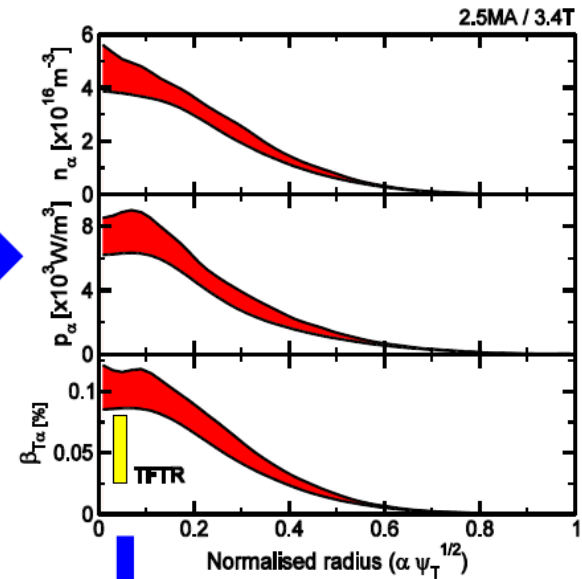
R. Dumont

- **Scenario under development since JET campaign C36 (2015), now ready for DT**
 - M15-24: Target discharge for TAEs in DTE2 and fast particle physics in all scenarios (SC: Mailloux, Dumont)
 - M18-03: Scenario for study of energetic particles and EP driven instabilities in DT (SC: Dumont, Keeling + Fitzgerald)
 - M21-09: Study of EP and EP driven instabilities in DT plasmas with afterglow (SC: Dumont, Keeling, Fitzgerald)
- **Objectives (for DT)**
 - Observe and characterise **alpha-driven instabilities** in DT plasmas at **elevated q_{min}** and with **afterglow** (C41)
 - Document **energetic particle-induced transport** in elevated q-profile DT plasmas (C41)
 - Demonstrate **TAE antenna** capability to probe **stable modes** in **Alfvén** and **acoustic range** of frequencies in the presence of alphas (C41)
 - Evaluate the **threshold** in alpha pressure gradient for the onset of Alfvén instabilities (C41)
 - Compare and document differences to results obtained in **JET DTE1** and **TFTR** (C41)
 - Perform **alternative low q_{min} afterglow scenarios** if high q_{min} route does not provide AE evidence (C41)
 - Validate **models for EP generation and MHD stability** in the presence of EPs (C41)
 - Refine **predictions of EP instabilities** and their impact in various **ITER scenarios** (C41)
- **Main features of scenario** [Dumont, IAEA 2020]
 - Afterglow discharge to minimise TAE damping following high-performance phase
 - Early NBI application to trigger ITB and generate elevated q-profile
 - No RF before period of interest
 - Bespoke RTCC scheme to trigger afterglow at peak-performance time
 - ELM pacing using D or H pellets

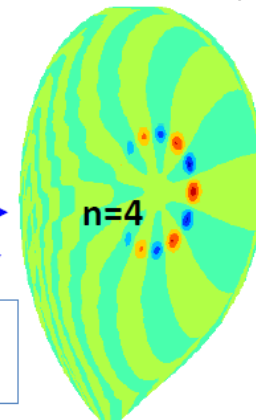
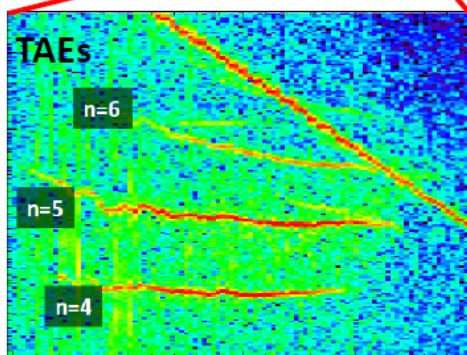
“After-glow” ITB scenario shows promising route for alpha-driven mode studies



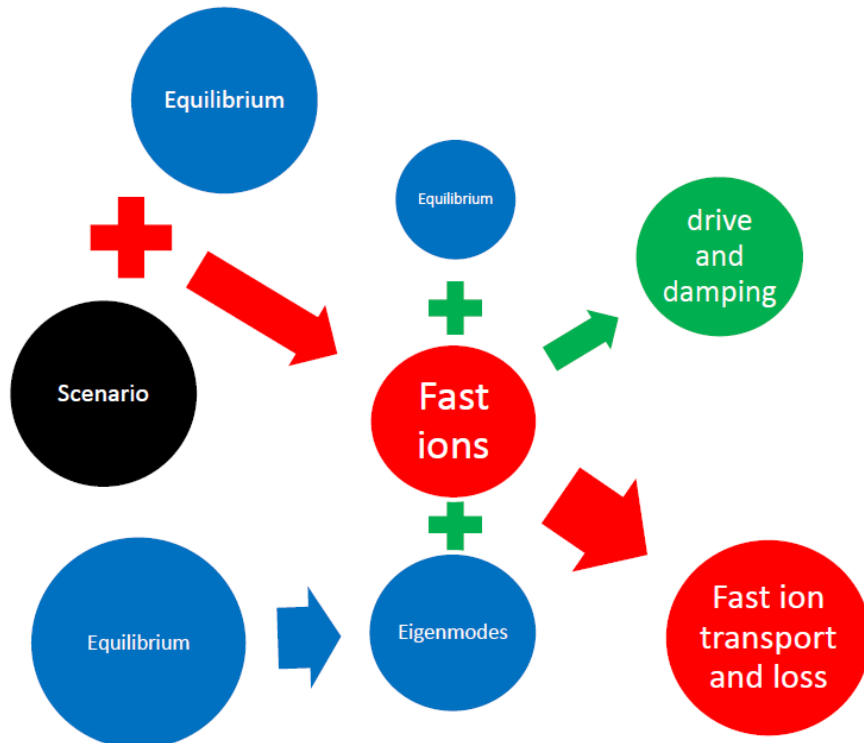
50/50 D-T
Prediction
(TRANSP)



Stability
calculation
(MISHKA)



R. Dumont, Nuc. Fus. 2018
S. Sharapov, EX/P1-28



[M. Fitzgerald, M18-03 team meeting]

- **Scenario**
 - Interpretative D-D
 - Predictive D-T
- **Equilibrium**
 - Interpretative D-D
 - Predictive D-T
- **Energetic ions**
 - ICRH (D-D)
 - NBI (D-D & D-T)
 - alphas
- **Stability (D-D & D-T)**
 - Eigenmodes
 - Linear damping
 - Linear and non-linear drive

- During/between the experimental sessions, including DT campaign (C41) and possible subsequent D campaign (C42)
 - SC require « fast » answers to make decisions
 - No need to be fully predictive → essentially need to assess if a given choice has positive or negative impact
 - Modelling effort ongoing in parallel but so far with relatively limited impact on the experimental strategy for future sessions

