NTM analysis and modelling of JET hybrid scenario: Ne seeding discharge #90279 (I_p = 1.4 MA, B_t = 1.9T, P_{NBI} = 16 MW, β_N = 2.1) 4/3 & 3/2 tearing modes

- **LINEAR analysis with MARS full MHD, toroidal code**
  - fully compliant with EU-IM & IMAS environment

- **Effect of NTM on W heavy impurity density profile**
  - NON LINEAR analysis via NTM module integrated in the modular European Transport Simulator (ETS)
  - ETS simulation with Bohm-gyro-Bohm model, imposing CONSTANT W Diffusion (D_W) and Convection (V_W) coefficients, **EFFECTS introduced by NTM on the D_W and V_W isolated and quantified** => D_W and V_W perturbed by NTM using a Gaussian function with width proportional to mode size => small in this and similar shots w ~ 0.03 m for 4/3 mode and w~0.04m for 3/2 mode.

  W density profile by SXR data at 3/2 onset time t=47.3s with green region where NTM can play a role

  Isolated effects of NTM on the W density profile calculated by the NTM module in ETS:
  - W concentration not sensitive to the presence of NTM with SMALL sizes, even if they can provide changes of the W density profile at given off-axis positions. NTM with larger amplitude could affect the plasma core

4/3 and 3/2 modes LINEARLY STABLE (NTM) for all the considered hybrid pulses in agreement with the results from other codes as the NTM module in ETS.

However, saturated NTMs detected in the spectrogram are **non linearly unstable** for neoclassical effect