Contribution ID: **37** Type: **not specified**

Resonant interaction of fusion alphas and shear-acoustic Alfvén eigenmodes in burning plasmas

Wednesday 8 February 2023 14:35 (15 minutes)

In future nuclear-fusion reactors, the energy of the alpha particles produced is expected to ignite and keep the fuel plasma burning. Yet, resonant interaction with Alfvén eigenmodes may transport these alphas away from the fusing core and towards the reactor structure. Research about such resonant interactions has focused mainly on waves from the shear (or incompressible) branch of the Alfvén dispersion relation. However, recent results indicate that shear-acoustic branch couplings may also produce eigenmodes able to resonantly interact with fusion alphas, particularly in burning plasmas. The goal of this project is to understand the physics of such resonant interaction using large-scale numerical simulations to find if coupled shear-acoustic eigenmodes have a role similar to that of the well-known shear ones in the transport of alpha particles in burning plasmas. To this end, a particle tracer code, employed to follow a large alpha-particle population, will be coupled with the equations that evolve the amplitudes and phases of a pre-computed set of shear-acoustic Alfvén waves, in order to identify and describe the resonance and saturation mechanisms at play. Particular emphasis will be placed on ITER burning plasmas

Author: PALMA, João (Instituto Superior Técnico)

Presenter: PALMA, João (Instituto Superior Técnico)