Summary slide

Last two years work:

- The JOREK simulation found the low-n kink-peeling modes (KPMs) in the edge of the ASDEX-Upgrade QH-mode plasma.
- The KPMs has a helical structure on the plasma density 3-D localized at the separatrix in the toroidal and poloidal direction.
- Resistive wall has a significant influence on the non-linear evolution of KPMs in ITER plasmas.
- The simulations show that E×B rotation/shear plays an important role for ITER high Q plasmas to enter and remain in the QH-mode regime.

Importance:

- This is the study towards determining whether the physics mechanisms leading to the QH-mode behaviour could be at work in ITER plasmas and thus whether this confinement regime can be considered as an alternative to the controlled Type I ELMy H-mode for ITER high Q operation;
- The understanding of the physics mechanisms that lead the plasma to develop into a QH-mode regime with a saturated external KPMs will allow us to evaluate whether this regime can be a viable option for high fusion performance operation of ITER plasmas.

Future work:

- Investigate the influence of 3-D magnetic fields rom in-vessel coils on ITER Q =10 QH-mode plasmas;
- Study the 3D aspects of the divertor power fluxes during QH modes in ITER Scenarios.