

# Non-linear Simulations of Edge Localized Modes and Non-linear Resistive Wall Modelling

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The first part of the presentation is concerned with edge localized modes (ELMs). Experimental observations have shown a strong poloidal and toroidal localization of magnetic structures [1] and pronounced  $n = 1$  components [2]. We are able to reproduce both features with non-linear ELM simulations in realistic ASDEX Upgrade tokamak geometry using the MHD code JOREK [3, 4]. External magnetic perturbations are able to suppress edge localized modes in various fusion devices. First non-linear simulations of the interaction between ELMs and external perturbation fields in ASDEX Upgrade will be shown.

The second part addresses non-linear modelling of resistive-wall effects, i.e., the interaction between plasma and conducting structures via eddy currents. The modelling is achieved via a coupling of the JOREK and STARWALL [5] codes. First results for resistive wall modes and vertical displacement events are presented. An outlook is given onto the long-term goal of full-disruption simulations which will require further model extensions.

## References

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