Overview of recent physics results from MAST - DTU Orbit (02/12/2018)

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New results from MAST are presented that focus on validating models in order to extrapolate to future devices. Measurements during start-up experiments have shown how the bulk ion temperature rise scales with the square of the reconnecting field. During the current ramp-up, models are not able to correctly predict the current diffusion. Experiments have been performed looking at edge and core turbulence. At the edge, detailed studies have revealed how filament characteristics are responsible for determining the near and far scrape off layer density profiles. In the core the intrinsic rotation and electron scale turbulence have been measured. The role that the fast ion gradient has on redistributing fast ions through fishbone modes has led to a redesign of the neutral beam injector on MAST Upgrade. In H-mode the turbulence at the pedestal top has been shown to be consistent with being due to electron temperature gradient modes. A reconnection process appears to occur during edge localized modes (ELMs) and the number of filaments released determines the pressure profile at the divertor. Resonant magnetic perturbations can mitigate ELMs provided the edge peeling response is maximised and the core kink response minimised. The mitigation of intrinsic error fields with toroidal mode number n > 1 has been shown to be important for plasma performance.

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