



MAST Upgrade status and first results

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The MAST Upgrade tokamak will start operating in 2019 with unique capabilities to produce conventional and novel divertor configurations to allow for detailed studies and comparison in a single device. The construction of MAST Upgrade is now complete and integrated commissioning is underway. The upgrade includes the installation of 19 poloidal field coils, a new central solenoid, two tightly baffled divertor cassettes, on and off axis neutral beam injectors and new diagnostics.

The machine is up-down symmetric with two closed divertor chambers. Each chamber is surrounded by 7 poloidal field coils (giving 14 in total) allowing for careful control of the magnetic geometry, including strike point location, field line length within the divertor, poloidal flux expansion and how their variation across the scrape-off layer, whilst keeping the shape and performance of the core plasma unchanged.

The new in-vessel diagnostics include an extensive array of magnetics sensors for equilibrium reconstruction, analysis of MHD activity, plasma control, and characterisation of halo currents, together with 850 Langmuir probes for characterising the plasma in contact with the graphite tiles in the divertors and 64 channels of foil bolometry to measure the distribution of radiation losses across the device. Other new diagnostics include a divertor Thomson scattering system and several new filtered visible and IR cameras

The first physics campaign will use the new capabilities of MAST Upgrade to explore the effects of tailoring the magnetic field in the divertors to maximise radiation losses from the plasma and reduce the divertor heat loads. Operation of the on and off axis neutral beams will be optimised to reduce the redistribution of energetic particles due to instabilities excited by gradients in the fast ion density profile, and to tailor the q profile to minimise MHD instabilities. The effect of the divertor configuration and neutral gas pressure in the main chamber on access to the high confinement, H-mode, regime will be explored to maximise the pedestal height, thereby improving the performance of the core plasma

In this talk plans for the restart of MAST Upgrade will be presented, and results from the first plasma and first campaign will be discussed as well as opportunities for new collaborations.