Abstract Submitted
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Control of energetic particle driven modes in MAST[1] DAVID KEELING, TOM BARRETT, CLIVE CHALLIS, NICK HAWKES, OWEN JONES, KEN MCCLEMENTS, ALEX MEAKINS, JOE MILNES, CCFE, UK, MARCO CECCONELLO, IWONA KLIMEK, Uppsala University, Sweden, MIKHAIL TURNYANSKIY, EFDA CSU, Garching, MAST TEAM — Core MHD is known to redistribute fast ions originating from Neutral Beam Injection (NBI). Theory suggests that these modes are driven by gradients in the fast ion distribution, providing the possibility for instability control by optimisation of the fast ion pressure profile to suppress these modes and prevent the redistribution or loss of the fast ions themselves. Experiments on MAST have demonstrated this approach by vertically displacing the plasma to achieve off-axis NBI fast ion injection [Turnyanskiy M. *et al* 2013 Nucl Fusion **53** 053016] or by changing plasma density or NBI power to vary the magnitude of the fast ion pressure [Keeling DL *et al* submitted to Nucl Fusion]. Measurements using various fast-ion diagnostics show large redistribution in the absence of mitigating effects [Cecconello M *et al* submitted to Plasma Phys Control Fusion] whilst measurements and comparisons with modelling have confirmed the suppression of redistribution by appropriate optimisations of the fast ion pressure. These results have led to design options for MAST-Upgrade to allow access to a wide range of plasma parameters without significant fast ion redistribution.

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