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2.27 First Measurements of a scintillator based Fast-Ion Loss Detector near the ASDEX Upgrade Divertor

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A new reciprocating scintillator-based fast-ion loss detector (FILD)¹ has been installed a few centimeters above the outer divertor of the ASDEX Upgrade tokamak and between two of its lower ELM mitigation coils. The detector head containing the scintillator screen, Faraday cup, calibration lamp and collimator systems are installed on a motorized reciprocating system that can adjust its position via remote control in between plasma discharges. Orbit simulations are used to optimize the detector geometry and velocity-space coverage. The scintillator image is transferred to the light acquisition systems outside of the vacuum via a lenses relay (embedded in a 3D-printed titanium holder) and an in-vacuum image guide. A Charge Couple Device (CCD) camera, for high velocity-space resolution, and an 8x8 channels Avalanche Photo Diode (APD) camera, for high temporal resolution (up to 2MHz), are used as light acquisition systems. Initial results showing poloidally localized fast-ion losses due to Edge Localized Modes (ELMs) and externally applied 3D magnetic perturbations are discussed. Tomographic reconstruction techniques are used to infer the escaping ion velocity-space from direct measurements with unprecedented resolution. [1] M. Garcia-Munoz et al., RSI 80, 053503 (2009)

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