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P2.157 Operation of probe heads on the Multi-Purpose-Manipulator at W7-X

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The Multi-Purpose-Manipulator (MPM) has been operated, as a versatile carrier system for probes, since the first campaign OP. 1.1 in 2015 at Wendelstein 7X (W-7X). The combined probe, a combination of Langmuir, Mach and magnetic probes, was used. For the second campaign OP. 1.2a in 2017, with an island divertor, an upgraded combined probe, a fluctuation probe, a retarding field analyzer (RFA), a Mach probe array, a laser blow off target and a material probe holder were added to the range of plasma edge diagnostics. In addition, a system for gas injection in the form of a dedicated head and an additional port on existing probes for fueling and impurity seeding experiments was utilized.

The new diagnostic probe heads were designed to address specific tasks, such as measuring the edge fluctuations, the ion temperature and the radial Mach number profiles. The minimal setup, for probes that were plunged with a fast stroke, was the measurement of the electron temperature and density and the radial electric field. The probes were able to measure in the scrape off layer up to the last closed flux surface. By combining the measurements from all probes, the full picture of the profiles of the electron temperature and density for all configurations, that were used during the second campaign, can be studied. Not in the same position, but in the same flux tube or comparable radial range are other diagnostics like the divertor Langmuir probes, the poloidal correlation reflectometer and the infrared cameras.

This contribution will use the overlap of diagnostics, that allowed for a more complete characterization of the edge plasma parameters during the campaign, by comparing the probe results with each other and complementary edge diagnostics.

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