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**Simultaneous determination of sheath parameters in an rf-plasma by common and non-conventional diagnostics**

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For a better understanding of the plasma-wall interaction in a capacitively coupled rf-plasma the combination of different diagnostics is used to determine energy flux to the surface, ion energies bombarding the surface and forces acting on the surface in dependence on different plasma conditions.

For the determination of the plasma conditions such as electron density and temperature in addition to plasma and floating potential, a Langmuir probe with rf-compensation is used. A specially designed setup of two parallel electrodes with integrated probes are installed in the reactor. The lower electrode is driven by a 13.56 MHz rf-voltage. The upper grounded electrode has different openings in which a passive thermal probe (ptp), a retarding field analyser (rfa) and a force probe (fp) are embedded, respectively. Their surfaces are parallel to the surface of the upper electrode.

The ptp allows the measurement of the overall heat flux to its surface, the rfa determines the ion energies coming to the surface via a scanning grid and the force probe measures the force exerted on the surface by the plasma species. The setup of the four diagnostics allows a simultaneous investigation of energy and particle transport governing the sheath of an rf-plasma.

**Keywords**

sheath

diagnostics

non-conventional

plasma-wall-interaction