Abstract Submitted
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Investigations on an inductively coupled magnetic neutral loop discharge[1] DEBORAH O'CONNELL, DRAGOS CRINTEA, MARTIN BRENNSCHEIDT, TIMO GANS, UWE CZARNETZKI, Institute for Plasma and Atomic Physics, Ruhr-University Bochum, Germany — An inductively coupled magnetic neutral loop discharge (NLD) was designed and has been investigated using various diagnostic techniques. Coaxial coils produce a magnetic field vanishing along a ring in the discharge - the so called neutral loop (NL). An oscillating rf electric field along the NL is induced through a planar four turn ICP antenna operated at 13.56 MHz. Stochastic electron heating in the NL allows for plasma operation at extremely low pressure, down to 10^{-2} Pa. These conditions are ideal for anisotropic etching, while uniform plasma surface treatment can be achieved by varying the NL diameter. Langmuir probe measurements, revealing electron densities up to $10^{12} cm^{-3}$ and electron temperatures up to 10 eV, are in good agreement with global model predictions. Phase resolved optical emission spectroscopy (PROES) allows us to distinguish the different power coupling mechanisms in the discharge. PROES is used to probe the high energy tail of the electron energy distribution function (EEDF), while the low energy part of the EEDF can be measured using phase resolved Thomson scattering.

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