

P 11: Diagnostische Methoden

Zeit: Mittwoch 11:30–12:15

Raum: 6C

P 11.1 Mi 11:30 6C

Ortsaufgelöste Messung der negativen Wasserstoffionendichte in einer HF-Quelle — ●SINA CHRIST-KOCH^{1,2}, URSEL FANTZ^{1,2} und NNBI TEAM² — ¹Lehrstuhl für Experimentelle Plasmaphysik, Institut — ²Max-Planck-Institut für Plasmaphysik, 85748 Garching,

Für zukünftige Fusionsexperimente werden Neutralteilchenheizungen benötigt, die auf der Basis von negativen Ionen (H^-/D^-) arbeiten. Am Institut für Plasmaphysik (IPP) werden Niederdruck-Ionenquellen ($P_{\max} = 90$ kW) entwickelt, die die benötigten Anforderungen erfüllen sollen ($j_{D^-} = 20$ mA/cm² bei 0.3 Pa, Homogenität ≥ 90 %). Zur Messung der örtlichen Verteilung der negativen Wasserstoffionen wird das Photodetachmentverfahren angewandt. Dabei lösen die Photonen eines gepulsten Nd:YAG-Lasers ($\lambda = 1064$ nm, maximale Leistung 200 mJ pro Puls, Pulsdauer ~ 7 ns) die zusätzlichen Elektronen der negativen Ionen ab. Diese werden mit einer positiv vorgespannten Langmuirsonde gemessen, deren Position in der Quelle verändert werden kann. Damit wurden Profile des Verhältnisses negative Ionendichte zu Elektronendichte gemessen. Bei bekanntem Elektronendichteprofil lässt sich das Profil der negativen Ionendichte bestimmen. Die besonderen Herausforderungen bei diesen Messungen lagen bei den Störungen durch die Hochfrequenz ($f = 1$ MHz), dem Einfluss externer Magnete und dem Quellenpotential von -20 kV.

P 11.2 Mi 11:45 6C

A remote ellipsometer for TEXTOR — ●TIMO DITTMAR¹, ACHIM VON KEUDELL¹, and ARKADI KRETER² — ¹Ruhr-Universität Bochum — ²Forschungszentrum Jülich

Deposition and erosion of plasma faced surfaces within fusion reactors are a key issue for the life time estimation of the first wall of present and future fusion experiments. At present an in-situ estimate of both, the erosion rates and changes in composition and texture of the deposited

layers is not possible. This gap could be closed with ellipsometry. It provides mono layer film thickness resolution and allows the precise and sensitive determination of the optical properties of thin films with high accuracy. This makes ellipsometry suitable to study processes at the plasma-wall interface in real time. Nevertheless, conventional ellipsometric instruments are not compatible with the Tokamak environment due to the Faraday-effect in the retarding elements and problems with optical access to the divertor region. The limitations of conventional Ellipsometry can be overcome with the construction of an in-situ reverse ellipsometry probe head using a four diode Stokesmeter. In this contribution we present the results during the testing and calibration of our miniature ellipsometric probe head on an ICP reactor and the first results from campaigns at TEXTOR.

P 11.3 Mi 12:00 6C

Real time density control using CO₂ dispersion interferometer at TEXTOR — ●MIKHAEL MITRI¹, ANDREJ LIZUNOV², BERND SCHWEER¹, and WOLFGANG BIEL¹ — ¹Institut für Plasmaphysik, Forschungszentrum Jülich — ²Budker Institute of Nuclear Physics, Novosibirsk, Russia

The line-integrated electron density in TEXTOR tokamak is being measured with a new dispersion interferometer based on the different dispersion of the fundamental and second harmonics of a continuous CO₂ laser, in which the beams are guided coaxially twice through the TEXTOR plasma. In order to compare the phase shift of both wavelength, the fundamental frequency is doubled again after plasma passage. The line-averaged density is calculated in real time with 50 kHz resolution, and used for the density control at TEXTOR. One channel is now in operation and 10 to 16 channels will be installed in Summer 2007, in which five of them will be used for density and horizontal plasma position control in real-time. The control system is fully digitalized and all channels are synchronized.