

Abstract Submitted  
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**Cross-correlation diagnostics of electrostatic fluctuations in a helicon source** MICHAEL KRAEMER, Ruhr University Bochum — The absorption of helicon waves was observed to be intimately connected with the excitation of short-scale electrostatic fluctuations [1]. Cross-correlation techniques using microwave back-scattering at the upper-hybrid resonance as well as electrostatic probes enable measurements of their frequency and wavenumber spectra. The low-frequency band can be attributed to ion-sound fluctuations, while the high-frequency fluctuations obey the dispersion relation of Trivelpiece-Gould waves. The fluctuations satisfy the matching conditions for the parametric decay instability of the helicon wave. Operating the helicon discharge in a pulsed mode, the growth rates and the thresholds of the fluctuations can be deduced from their temporal growth in a wide parameter range. Good agreement with a theory that accounts for the non-zero axial wavenumber of the helicon pump was achieved. The close relationship between the rf absorption and the excitation of the fluctuations is studied in more detail by performing time- and space-resolved measurements of the helicon field and the electrostatic fluctuations. In particular, the role of the radial plasma inhomogeneity on the parametric excitation of the fluctuations is examined.- Supported by the Deutsche Forschungsgemeinschaft (SFB 591, Project A7).- [1] B. Lorenz, M. Krämer, V.L. Selenin, Yu.M. Aliev, Plasma Sources Sci. Technol. 14, 623 (2005).

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