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Sorting Category: 5.1.1.2 (Experimental)

Fast Electron Temperature Measurements Based on Langmuir Probe Current Harmonic Detection on DIII-D¹ D.L. RUDAKOV, J.A. BOEDO, R.D. LEHMER, R.A. MOYER, G. GUNNER, University of California, San Diego, J.G. WATKINS, Sandia National Laboratories — A comparatively new method for the measurement of electron temperature with high spatial and temporal resolution was recently implemented on a fast reciprocating probe on the DIII-D tokamak. The method is based on detection of harmonics generated in the current spectrum of a single Langmuir probe driven by high-frequency sinusoidal voltage. In the experiment reported here, the probe was driven at 400 kHz thus allowing temperature measurements with a bandwidth of up to 200 kHz. The first (400 kHz) and the second (800 kHz) current harmonics were detected by analog circuits, while the raw probe voltage and current were recorded at high sampling rate (5 MHz) to perform digital spectral analysis. The results obtained using those two methods are compared with each other and with swept double probe data. The suitability of the harmonic technique for turbulent heat flux measurements is tested, and several options for further improvements are suggested.

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☐ Prefer Oral Session
☒ Prefer Poster Session

Richard Moyer
rmoyer@ucsd.edu
University of California, San Diego

Special instructions: DIII-D Poster Session 2, immediately following JC Rost
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