

Abstract Submitted  
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**Dual-Array Electron Cyclotron Emission Imaging (ECEI): a New Millimeter Wave Imaging System for Electron Temperature Fluctuation on the DIII-D Tokamak**<sup>1</sup> N.C. LUHMANN, JR., B.J. TOBIAS, C.W. DOMIER, X. KONG, T. LIANG, University of California, R. JASPERS, A.J.H. DONNE, FOM-Institute for Plasma Physics Rijnhuizen, M. SMITH, R. NAZIKIAN, Princeton Plasma Physics Laboratory, H.K. PARK, Pohang University of Science and Technology — A new diagnostic tool has been developed for simultaneous real-time imaging of electron temperature fluctuations at both the high and low field sides. Separate imaging arrays spanning 75 to 110 and 90 to 140 GHz, respectively consist of 160 channels (20 vertical by 8 radial) with  $\sim 1$  cm<sup>2</sup> resolution, providing up to 55 cm of vertical plasma coverage. Fluctuations of 1% are measurable on  $\mu$ s time-scales. The technical capabilities of this diagnostic, as well as potential physics issues to be investigated, are discussed. The details of the constituent technologies, including advanced antennas and substrate lenses, quasi-optical planar filter components, and double down-conversion heterodyne signal detection will be addressed.

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