

Abstract Submitted  
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**Design Concepts for a Long Pulse Upgrade for the DIII-D Fast Wave Antenna Array**<sup>1</sup> P.M. RYAN, F.W. BAITY, J.B.O. CAUGHMAN, R.H. GOULDING, D.A. RASMUSSEN, ORNL, R.I. PINSKER, General Atomics, J.C. HOSEA, N.L. GREENAUGH, A. NAGY, J.R. WILSON, PPPL — A goal in the 5-year plan for the fast wave program on DIII-D [1] is to couple a total of 3.6 MW of RF power into a long pulse, H-mode plasma for central electron heating. The present short-pulse 285/300 antenna array would need to be replaced with one capable of at least 1.2 MW, 10 s operation at 60 MHz into an H-mode (low resistive loading) plasma condition. The primary design under consideration uses a poloidally-segmented strap (3 sections) for reduced strap voltage near the plasma/Faraday screen region. Internal capacitance makes the antenna structure self-resonant at 60 MHz, strongly reducing peak E-fields in the vacuum coax and feed throughs. Calculations using the 3D EM code CST Microwave Studio indicate peak voltages can be reduced by a factor of 3 and peak E-fields by a factor of 5, compared to the present antenna for the same power and load. Alternative designs for the internal capacitance to cope with geometry constraints will be presented.

[1] Project Staff, “Five-Year Plan: 2009–2013,” General Atomics Report GA-A25889 (2008).

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