

THE UPGRADE OF THE DIII-D 110 GHz ECH SYSTEM TO 6 MW*

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ECH power has proven capabilities to both heat and drive current in energetic plasmas. Recent developments in high power sources have made the use of these capabilities in energetic plasmas feasible. For the second phase of ECH power on DIII-D, there will be 3 MW (source) added to the existing 3 MW for a total generated power of 6 MW. The up-grade is based on the use of the single disc CVD (chemical vapor deposition) diamond window 1 MW gyrotrons developed by CPI. All gyrotrons are connected to the tokamak by a low-loss-windowless evacuated transmission line using circular corrugated waveguide for propagation in the HE_{11} mode. Each waveguide system incorporates a two mirror launcher which can steer the rf beam poloidally from the center to the outer edge of the plasma and toroidally for either co- or counter-current drive. The total system overview and integration will be discussed along with the new aspects of the upgrade from building modifications to the new launchers. Much of the upgrade is comprised of existing designs, which will need only slight modifications, while some components have required new designs because of longer pulse lengths. The possibility and scope of future upgrade, to a total of 10 MW of generated power will also be discussed.

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