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Theory Experiment

ECH Launchers on DIII-D,* Y.A. Gorelov, J. Lohr, M. Cengher, D. Ponce, *GA*; R.A. Ellis, *PPPL* – Three fully articulating dual launchers, which can steer the rf beams poloidally and toroidally through $\pm 20^\circ$ in each direction, are installed on DIII-D. All are designed and built by PPPL. Each launcher has a fixed focusing mirror followed by a flat steering mirror. Two of the six focusing mirrors were damaged during the past 2 experimental campaigns on DIII-D. The focusing mirrors were made from stainless steel (SS) with a thin layer of copper (Cu) on the surface. Thermal calculation predicts that these mirrors should withstand pulse lengths up to 10 s with incident rf power of 850 kW from the existing gyrotrons. In 2008 local stress cracking of the Cu surface was found on some focusing mirrors. In some cases, the Cu was melted exposing the SS to the rf beam. Rapid thermal runaway and extensive melting resulted. All focusing mirrors were replaced with ones made from solid Al-15 Glidcop construction in 2011. The new design of steerable mirrors was also installed on all launchers. The steering mirrors are moved by dc electric motors, providing full poloidal scans in ≈ 2 s and improved positioning accuracy compared with the air motors previously installed.

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