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Plasma Source Development for Lockheed Martin's Compact Fusion Reactor Program ZACHARY HARALSON, CHRISTOPHER LOHFF, NICOLO MONTECALVO, JASON GUYTON, THOMAS MCGUIRE, MELISSA SHOWERS, RANDALL SOVEREIGN, Lockheed Martin Corporation — A multi-pronged plasma source development effort supports the Lockheed Martin Compact Fusion Reactor (CFR) program. The objective of the plasma source development effort is to build a plasma source that can provide a sufficiently dense plasma target for neutral beam heating in the CFR geometry (a linear encapsulated ring cusp). An ideal source would allow for high mirror ratios in the expansion regions (divertors) of the device, have a very high ionization fraction, have very low impurity levels, and create sufficiently dense plasma (>5 x 10^{19} m^{-3}). In addition to the arc-reflex thermionic source currently employed on the T4B linear encapsulated ring cusp experiment, we are developing three alternative technologies: a high power (>2 MW) MagnetoPlasmaDynamic source (MPD), a cross-field (ExB) homopolar type source, and a high power (>300 kW), high field (up to 1 T) RF source. We present the performance of these high power plasma sources and plans for incorporation onto the next experiment, T5.

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