

Abstract Submitted
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UHV Modifications & Cleaning Techniques to Allow High Temperature Operation in TCS/upgrade K.E. MILLER, J.A. GROSSNICKLE, A. TANKUT, University of Washington, RPPL — FRCs have been formed and sustained by Rotating Magnetic Fields in the TCS experiment. Steady-state operation has been achieved with many new and exciting features. The plasma density is set by the RMF parameters, but the temperature has been severely limited by high impurity content, with up to 80% of the input power lost to radiation. In order to improve the temperatures and flux levels, TCS is being extensively upgraded. Improvements include UHV qualified bonding of Invar bellows to the quartz tube section necessary to allow RMF application, and the use of wire seals to replace O-rings. The remainder of the system is stainless steel, and heater blankets will allow baking to 200 °C. Provisions are included for Ti/Li gettering and glow discharge cleaning. PVD deposition of Ta and W films is used on surfaces in near proximity to the FRC or its exhaust plasma, and control of recycling will be a priority. Extensive testing using an electron micro-probe and various spectroscopic techniques have been performed to establish appropriate UHV cleaning methods. Detailed data and methodology will be presented.

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