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Temperature Effects on Critical Current and Skin Time of High Temperature Superconducting Flux Conservers for Field Reversed Configuration Experiments[1] MATTHEW R. EDWARDS, CLAYTON E. MYERS, S.A. COHEN, PPPL — Using odd-parity rotating magnetic fields to heat plasma and drive current, the Princeton-Field-Reversed-Configuration (PFRC) experiment creates plasma with a unity ratio of volume-averaged plasma pressure to magnetic-field energy density. Radial confinement of the plasma will be achieved with an array of co-axial passive flux conservers (FCs) constructed by embedding BSCCO high-temperature-superconductor (HTS) tape in copper rings. The pulse duration of the experiment is limited by the current decay time of the FCs. We examine the performance of the HTS-FC rings between 77 and 105K and test cooling systems to determine a design point for the next-generation PFRC's FC array. The dependence of critical current and skin time on temperature for the FC is tested by measuring the time-dependent current in an aligned-gap HTS-FC ring at different temperatures; skin time is found to range from 800 to 400ms between 77 and 105K. Performance of a proposed cooling system is tested in vacuum at close to real conditions.

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