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Runaway electron mitigation in SPARC with a passively driven 3D coil[1] VALERIE IZZO, Fiat Lux, DARREN GARNIER, ROBERT GRANETZ, RYAN SWEENEY, MIT-PSFC — To prevent growth of a large runaway electron (RE) population during the current quench (CQ) of a SPARC disruption, suppression of the RE population is required. Deconfinement due to field stochasticity could be achieved with large amplitude 3D magnetic perturbations produced by a 3D coil passively driven by the plasma current decay [1]. This scenario is modeled in NIMROD using prescribed 3D magnetic fields calculated for a proposed coil design, specified at the boundary of the simulation domain. The time dependence of the 3D field amplitude is evaluated as the simulation progresses, as a function of the total plasma current during the current decay, reaching the maximum coil current amplitude as the plasma current goes to zero. The simulations are initiated from a SPARC equilibrium and a thermal quench is induced by radiation from massive Ne deposition, after which the CQ ensues. During the simulation, drift-orbits for RE test particles are calculated to determine RE losses along stochastic fields. Initial calculations with 3D field perturbations exceeding $\delta B/B=10^{-2}$ show complete loss of the RE test population within 2 ms of the start of the simulation. [1] A. Boozer, Plasma Phys. Control. Fusion 53 (2011) 084002

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