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Superconducting Accelerating Structure for High-Current Cyclotrons for Accelerator-Driven Subcritical Fission NATHANIEL POGUE, PETER MCINTYRE, AKHDIYOR SATTAROV, Texas A&M University — An accelerator driven molten salt fission core is being designed to provide reliable power by subcritical nuclear fission for the next few millennia. Fission is driven by proton beams from a flux-coupled stack of three high-current cyclotrons. A key innovation in attaining the needed beam current and efficiency is a superconducting Niobium rf accelerating cavity that can accelerate bunches in the 200 orbits uniformly. The unique design allows for several cavities to be stacked, and also provides uniform acceleration and eliminates higher order modes in the cyclotron. The design and properties of the superconducting cavity will increase the efficiency of the cyclotron and the overall energy amplification from the molten salt core by an order of magnitude compared to conventional designs.

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