

Abstract Submitted
for the DPP20 Meeting of
The American Physical Society

Recent developments in the design of ARC¹ BRANDON SORBOM, ALEX CREELY, SHIAOCHING TSE, DAN KORSUN, Commonwealth Fusion Systems, COMMONWEALTH FUSION SYSTEMS TEAM — The most recent developments in the design space for an ARC-class fusion power plant and plans for future technology development are presented. The original conceptual design of the ARC fusion power plant was presented in two papers published in 2015 and 2018. Although these papers presented one particular instantiation of ARC, this was not intended to be a “final” design but rather be a point within the spectrum of potential compact, high-field tokamak based power plants. Since the publication of the original papers, there has been development into both the physics and technology underlying compact, high-field tokamaks, as evidenced in numerous recent SPARC publications and hardware development being carried out by CFS and MIT. The same modeling and analysis toolset that has been used to inform the plasma physics basis for SPARC has been applied to the ARC design concept in order to more fully understand and define the parameter space in which ARC devices could exist. This includes first principles modeling and zero dimensional scaling. At the same time, technology development, specifically in HTS magnets over the past few years has progressed. HTS cable architectures have been developed for both AC and DC coil operation and a prototypical TF coil is currently being built and will be tested soon. This work in both physics and technology has provided a clearer picture of the feasibility of different development pathways to an ARC-like power plant.

¹Work supported by Commonwealth Fusion Systems

Brandon Sorbom
Commonwealth Fusion Systems

Date submitted: 29 Jun 2020

Electronic form version 1.4