Investigating The Use Of ANSYS HFSS To Simulate An SRF Cavity Coupled To An Infinite Coaxial Cable GAYATHRINI PREMAWARD-HANA, THOMAS OSEROFF, MATTHIAS LIEPE, Cornell University — The Cornell superconducting radio frequency (SRF) group was investigating a way to extend the use of ANSYS HFSS (ANSYS Electronics Desktop Version 2019.2.0), a finite element method solver for electromagnetic simulations, to simulate an SRF cavity coupled to a coaxial cable of infinite length. Since we cannot create a model of an infinite coaxial cable, the port end of the model should not be restricted to either one of perfect electric or magnetic boundary conditions. The inability of HFSS to directly solve for a combination of these boundary conditions, and the absence of an alternative boundary condition that met our requirements, made it necessary to employ another method to obtain accurate solutions. We focused on implementing an algorithm from a paper by Gulliford et al. [1] which aimed to give the final solution by combining two separate solutions, each obtained from HFSS. An external Mathematica program was written to conduct this combination. With this implementation, we were able to obtain an external quality factor for the setup that remained constant with changing the length of the model's coaxial cable, a result which cannot be obtained when HFSS is conventionally used with only its built-in functionality. [1] https://doi.org/10.1103/PhysRevSTAB.14.032002

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