

3D CFD SIMULATION OF VACUUM ARCS IN A TEST TUBE

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ABSTRACT

The contribution deals with the simulation of vacuum arcs in a test tube [1] using a three-dimensional (3D) Magneto Hydrodynamic Model (MHD) at two temperatures (electronic and ionic) based on Ansys Fluent. The model describes a subsonic arc in vacuum between the electrodes of the test tube, submitted to an Axial Magnetic Field (AMF) [2]. Figure 1 shows the 3D solution domain used in this study.

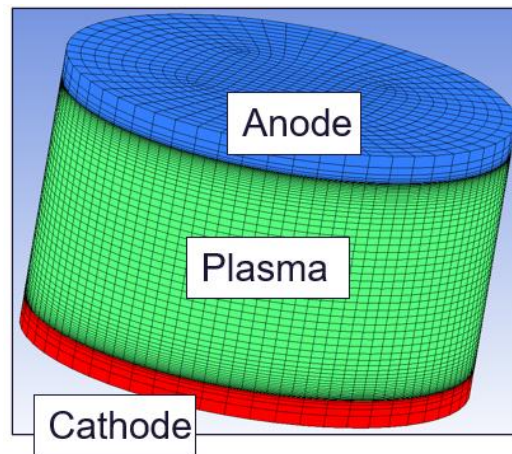


Figure 1: Geometry studied

The contribution presents results from a parametric study on arc characteristics including varying AMF strength, ablation rate and current intensity. The simulation model is validated by the comparison of measured and simulated arc voltages.

References

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- [2] C. SIMONNET, P. FRETON, J. J. GONZALEZ, F. REICHERT and P. PETCHANKA, in Journal Plasma Physics and Technology 12(3):208-213, 2025