Abstract Submitted
for the DPP01 Meeting of
The American Physical Society

Sorting Category: 8.0.0 (Student)

Modeling Electric Arcs in a Force-Free Environment[1]

I.M. TOLFREE, Columbia University, N.H. BROOKS, T.H. JENSEN, C.P. MOELLER, General Atomics — The behavior of the inter-electrodal region of an electric arc in a force-free environment is modeled. The assumption of weightlessness allows for the creation of horizontal arcs which are not subject to bowing by buoyancy effects. Consequently, axial symmetry obtains and transport by convection and hydrodynamic turbulence are absent. The arc is assumed long, so that electrode effects may be ignored. Additionally, the pressure is taken to be large enough that the mean free paths of the electrons, ions and neutrals are small compared to the other dimensions of the problem and, as a result, all the particles are in local thermodynamic equilibrium. The model yields radial temperature profiles for a range in operating conditions in which energy loss is dominated by thermal conduction at one extreme, and by radiative emission at the other. Model predictions are compared with experimental results.

[1]Work supported by General Atomics and DOE National Undergraduate Fellowship.

☐ Prefer Oral Session
☒ Prefer Poster Session

M.A. Mahdavi
mahdavi@fusion.gat.com
General Atomics

Date submitted: July 20, 2001 Electronic form version 1.4