Contribution ID: **58** Type: **Oral**

Simulation of 3D vortex jets in plasma torch application

The gas tunnel type plasma jet is an effective heat source for thermal processing application such as plasma spraying. The key concept of gas tunnel plasma is its torch configurations, especially the role of the vortex gas flow. This is very important for the stability and energy density of the plasma jet produced. This work studies the flow of gas vortex in 3 dimension using finite element simulation. The simulation is based on solving partial differential equation where the incompressible Navier-Stokes equation is used as a governing equation that decribes the laminar flow. The geometry of the plasma torch investigated is based on the design by A. Kobayashi. Key parameters investigated are gas pressure, velocity and profile of the vortex. It can be shown that the simulation produce results that are better matched to the experimental result than calculation done in previous works. The simulation can also show detail pictures of the vortex and its properties within the plasma chamber. This study will be useful in design optimization of the plasma torch in the future.

Author: KONGPIBOOLKID, Watcharapon

Co-author: MONGKOLNAVIN, Rattachat

Presenter: KONGPIBOOLKID, Watcharapon

Track Classification: Plasma Fusion and Technology