Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

**Langmuir Probe Characterization of Non-Thermal Plasmas Seeded with Metallic Nanoparticles**[1] KAMRAN SHOJAEI, LORENZO MANGOLINI, University of California Riverside — In this contribution, we study the interaction between low-pressure argon discharge and metallic nanoparticles via a Langmuir probe which is one of the most established techniques to obtain useful information about plasmas. An unexpected broad peak at the energy in the 4-9 eV range has been observed in the electron energy distribution. The peak position varies with the processing parameters, indicating not an electronic transition, but a phenomenon directly associated with the presence of metallic nanoparticles. We tentatively attribute this observation to field-assisted thermionic electron emission from the nanoparticle surfaces. To illustrate this, we developed a zero-dimensional steady state model for a plasma dosed with thermionically emitting nanoparticles. It comprises four modules which iteratively solve for plasma parameters given a known particle density. The particle charge predicted by our self-consistent model differs from the traditional OML theory, and the model demonstrates good fit with our experimental observations.

[1]Project is funded by department of energy

Kamran Shojaei
University of California Riverside

Date submitted: 11 Jun 2020 Electronic form version 1.4