

# Electrostatic Precipitation for Cleaning Mars Atmospheric ISRU Intakes

Michael R. Johansen

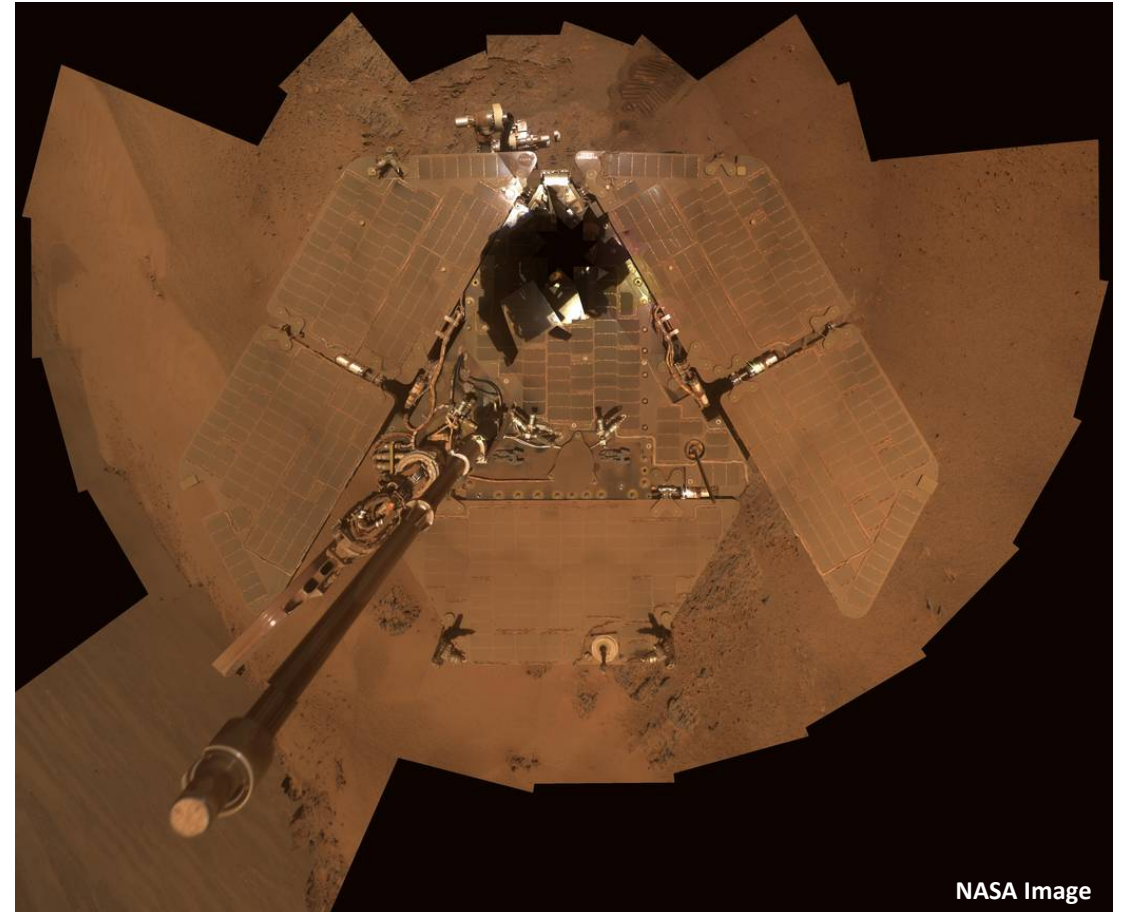
Research Engineer

NASA Kennedy Space Center

# The Dust Problem

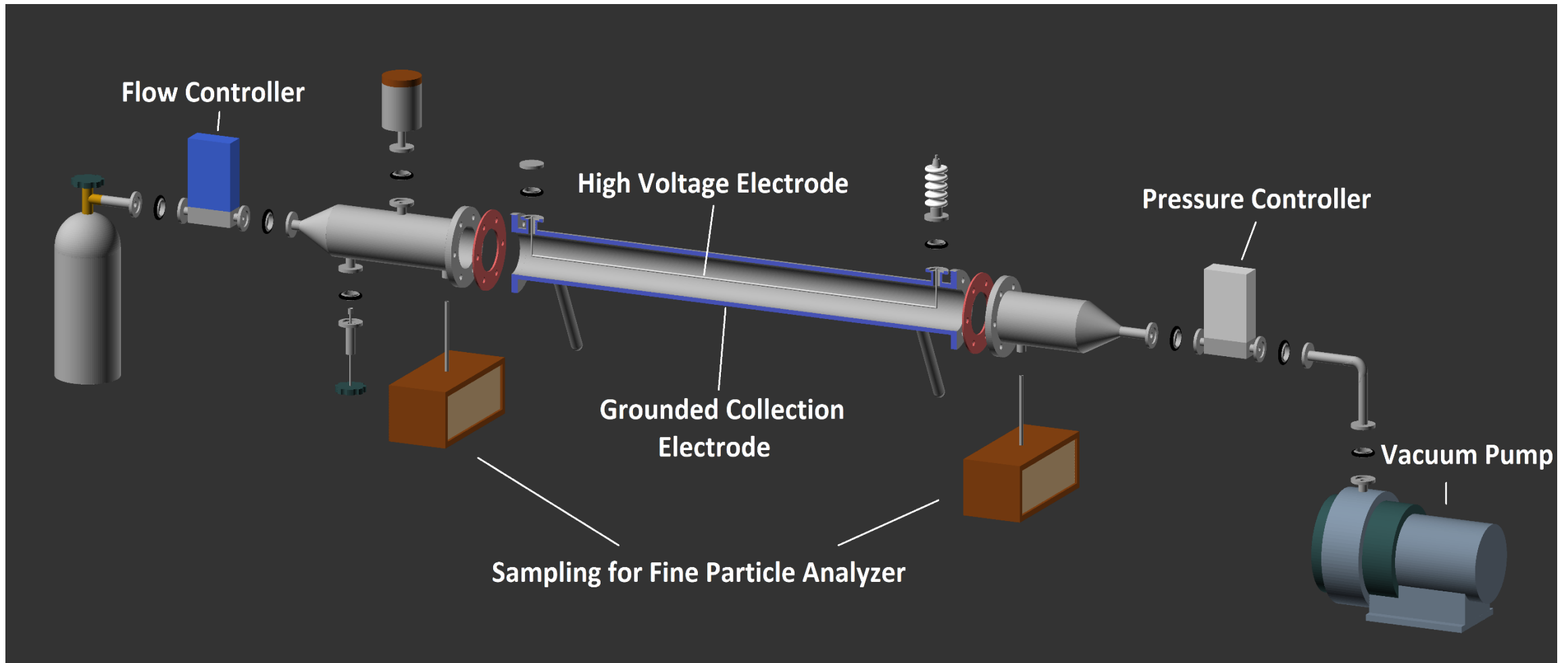


Dust coverage on Gene Cernan's EVA suit

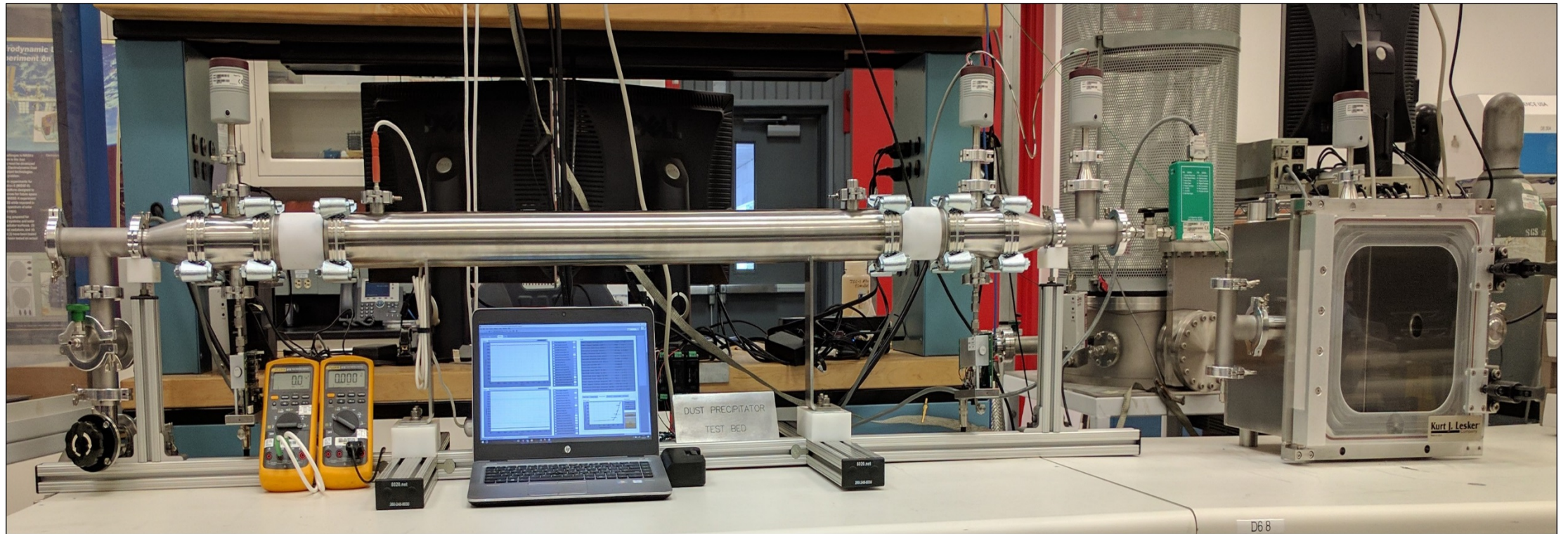


Dust coverage on MER solar panels

# Mars Electrostatic Precipitator Testbed

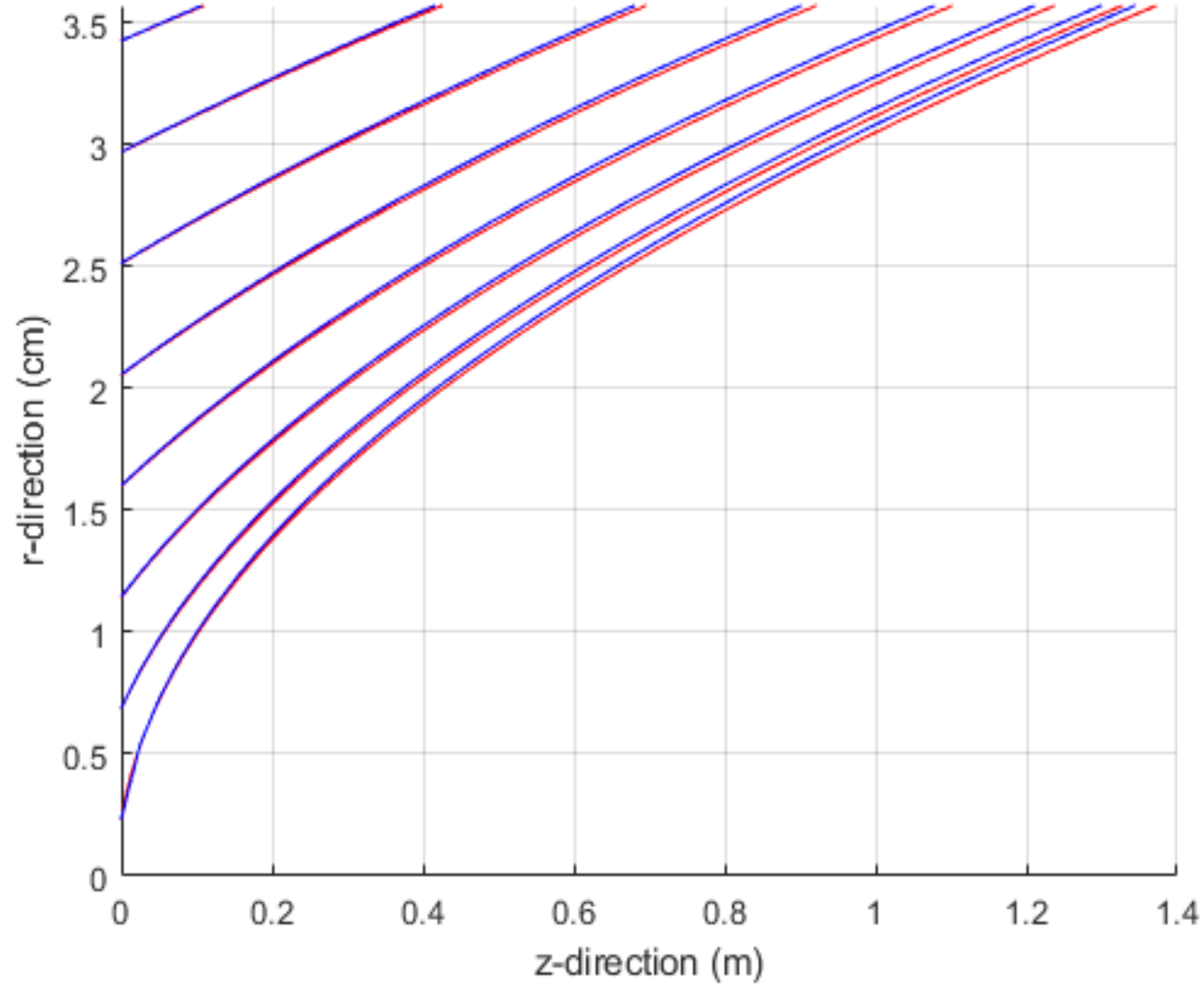


# Mars Electrostatic Precipitator Testbed

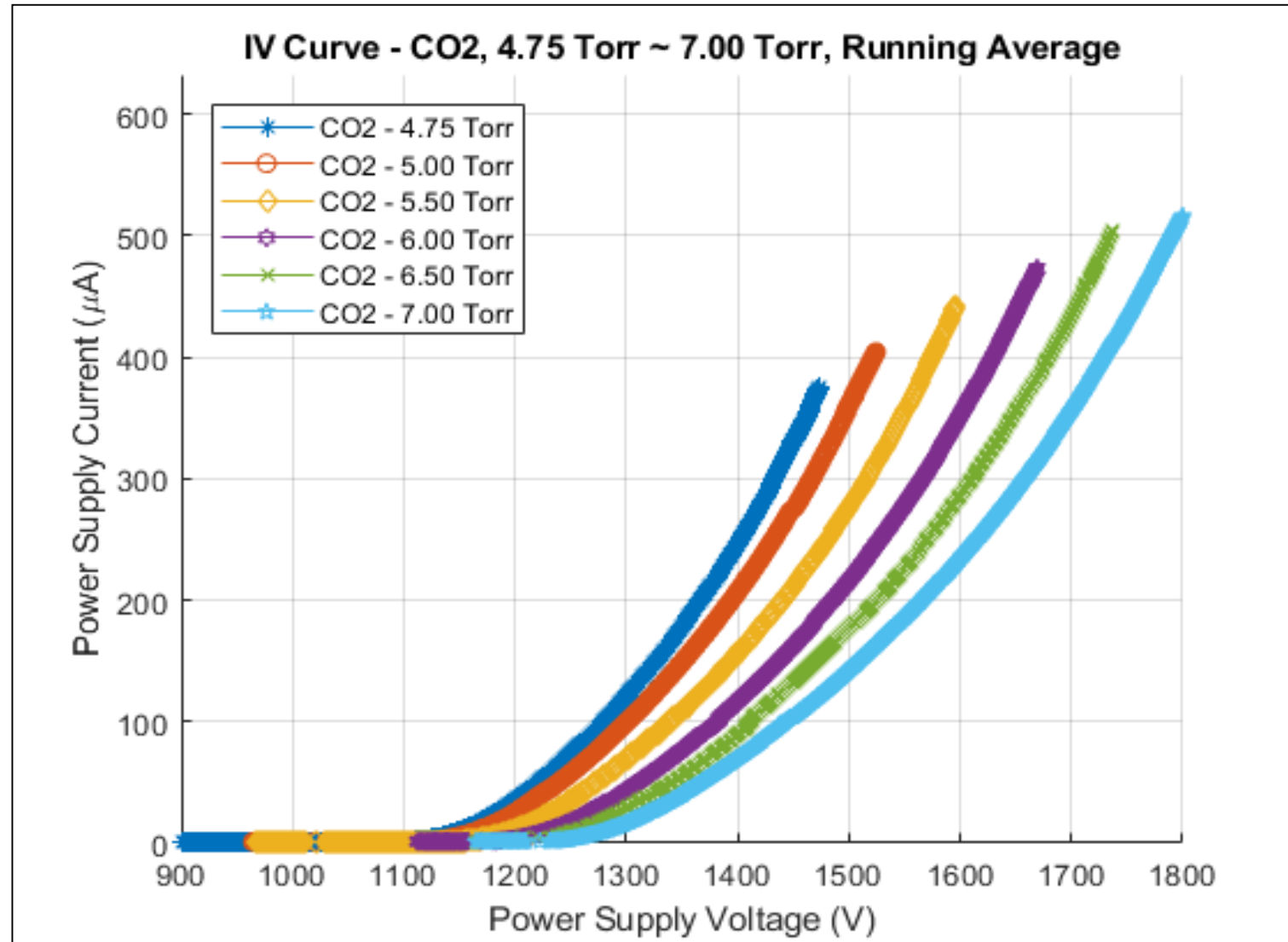


# Modeling and Simulation

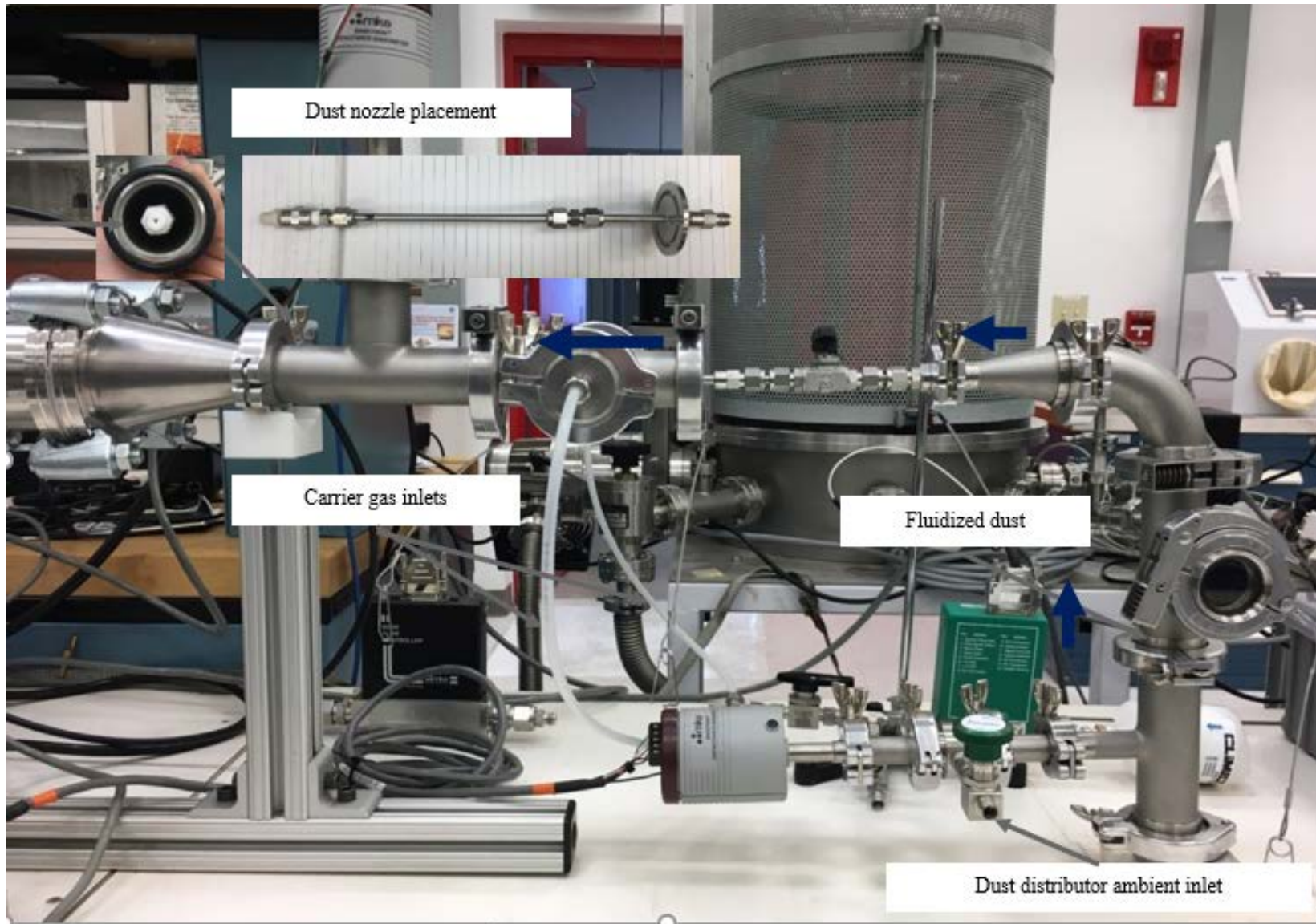
**MATLAB Trajectory (Red Line) vs. COMSOL Trajectory (Blue Line) @ 4.75 Torr**



# Electrical Characteristics



# Dust Dispersion Fluidized Bed



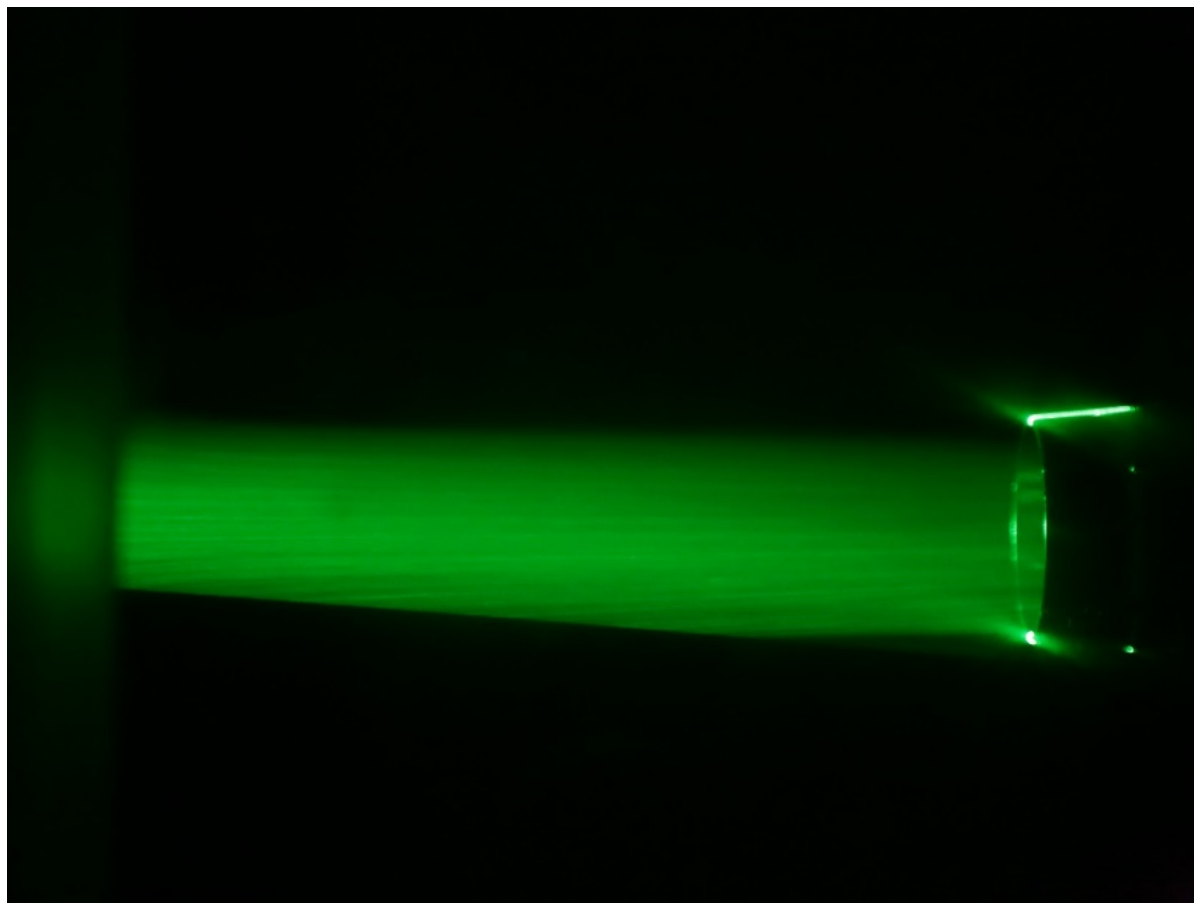
# Fine Particle Analyzer



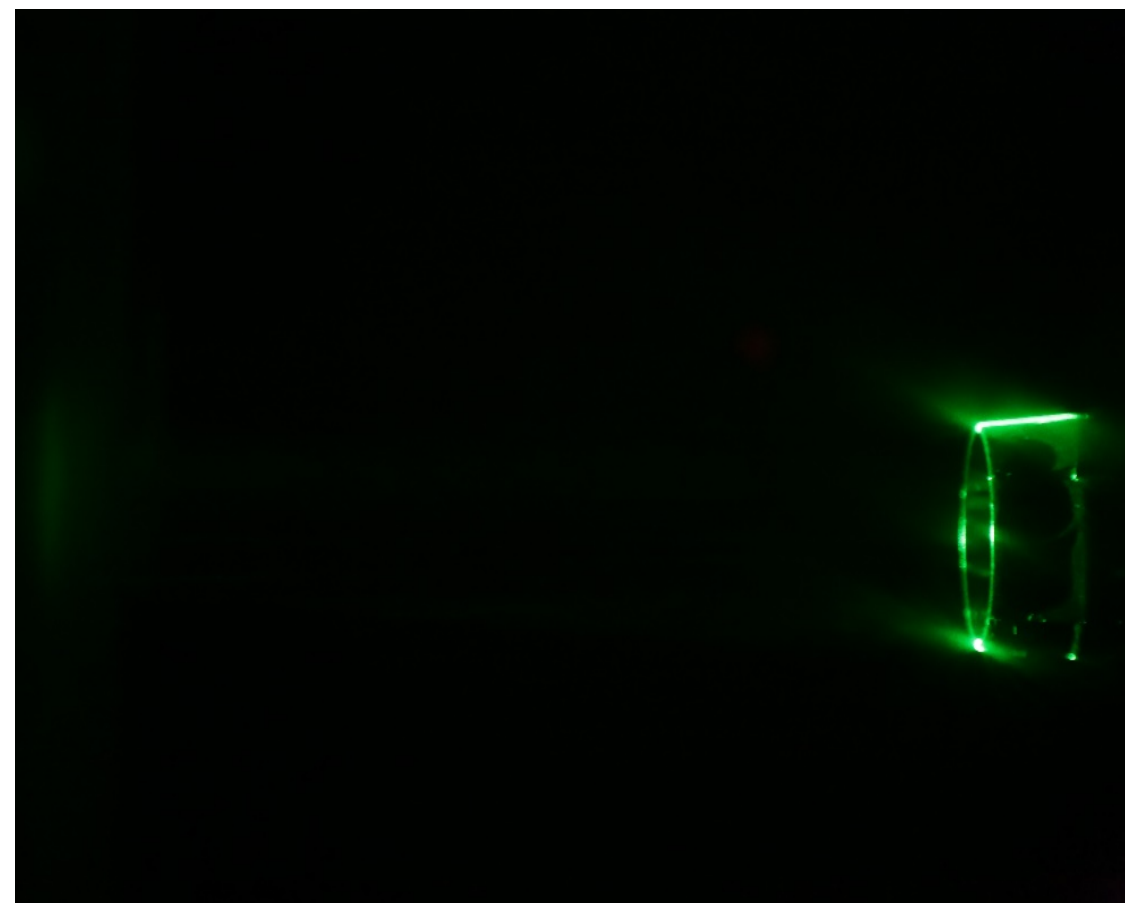
FPA sampling 50  $\mu\text{m}$  diameter particles in ESP testbed



# Laser Scattering



Electrostatic Precipitator off



Electrostatic Precipitator on

# Future Work

- Testbed will be used to test electrode geometries
- Laser scattering data combined with FPA data
- Consider operational constraints
- Perform long duration testing
- Perform materials analysis