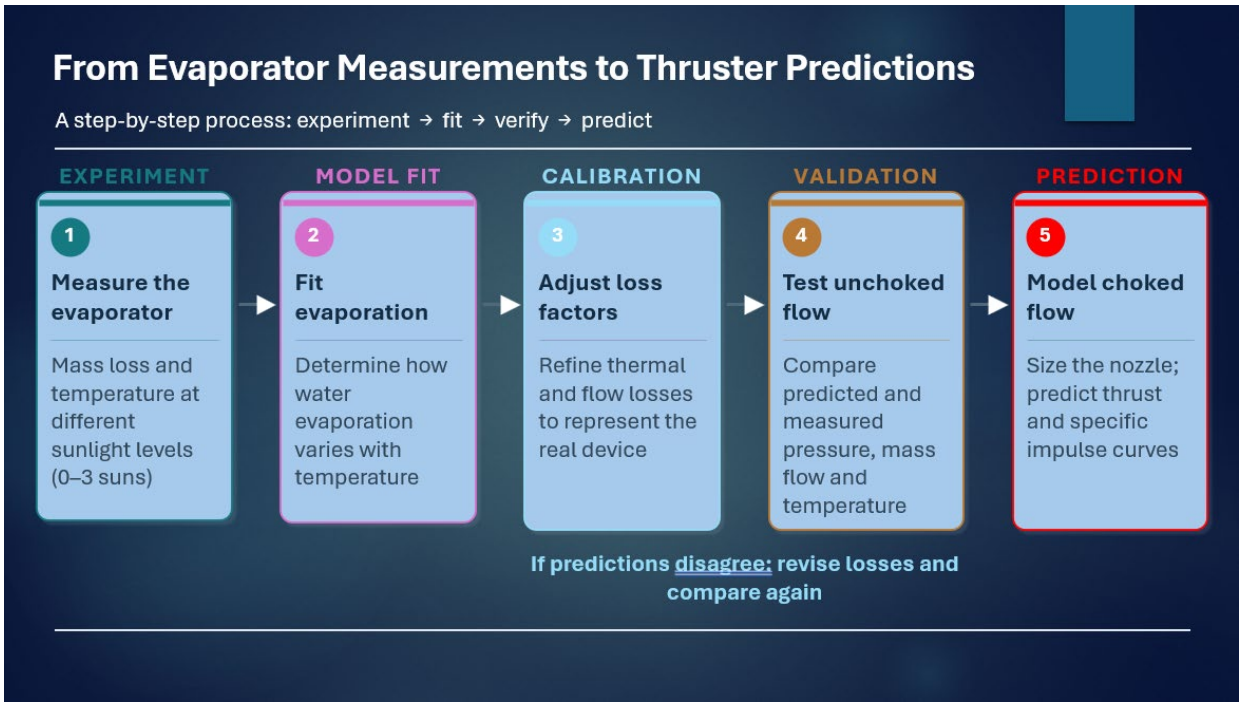
PHYSICS SEMINAR

Modeling Solar Thermal Evaporative Propulsion (STEP)

Josh Burget, Florida International University

Thursday, October 22, 2026
12:30 – 1:30 p.m.
Wubben 264

Solar thermal propulsion offers a potentially low-cost, low-power approach to maneuvering satellites. These thrusters use solar energy to heat and vaporize water, producing pressurized steam that is expelled through a nozzle to generate thrust. A steady-state lumped model has been developed using a modified Hertz–Knudsen–Schrage equation for evaporative flux and energy conservation. Experimental evaporation rates and surface temperatures at different solar illumination levels were used to fit model parameters. Compressible flow and rocket propulsion relations then estimated nozzle geometry, mass flow, exhaust velocity, thrust, and specific impulse. The model evaluates how solar concentration, evaporator surface area, and nozzle design affect predicted performance, providing a framework for selecting design parameters to meet mission requirements and identifying experiments needed to validate the feasibility of solar-thermal water propulsion.



Refreshments!