Effect of non-Maxwellian electron energy distributions on Langmuir probe measurements and heat transmission in tokamak divertor sheaths

- DPP-GEC Joint Session: Low Temperature Plasmas I (Tuesday morning)
  - Neutral beam etching
  - Electric double layers
  - *This talk*
  - Helicon mysteries
  - RF probes
  - Atmospheric plasmas

Talk outline

- Tokamak divertors as locations for non-Maxwellian effects (literature review)
- Overview of Langmuir probe interpretations (Classical vs. non-Local methods)
- Results of analysis in NSTX divertor showing non-Maxwellian plasmas from LP
- Comparison of sheath heat transmission coefficients calculated from measurement
- Comparison of formation mechanisms (fluctuations, non-local transport, atomic physics)

Still needed...

- Just received calibrated D-alpha (139396 only) and Li-I (396 and 404) from F. Scotti to better constrain OEDGE for heat-flux comparison
  - Need to rerun cases though the calibration has healthy error bar
  - Cases already run indicate much better agreement with non-local interpretation
  - F. Scotti also has performed Stark broadening analysis for 139396 indicating close agreement with non-local probe interpretation – finalizing analysis
- Have analytical methods for calculating expected distribution from known Te profile (Mannheimer Krook-approximation)
  - Need to code up and calculate from fluid background
- Have fluctuation estimation machinery in place, putting triple probe data into estimators for this element
  - Already have experimental indication that fluctuations cannot be the only mechanism involved (fluctuation characteristics identical in both discharges, larger hot-electron energy fraction in latter discharge)