# Revisions for PROPACEOS version 8.0.0

- Additional options for independent variables are available in a <u>Beta version of PROPACEOS</u>. These options are currently only available to a limited user base.

  The additional independent variable options are relevant to non-LTE plasma only. The variables are:

  - Plasma size (available for EOS and opacity calculations)
  - Three hot electron modeling parameters (available for opacity calculations only)
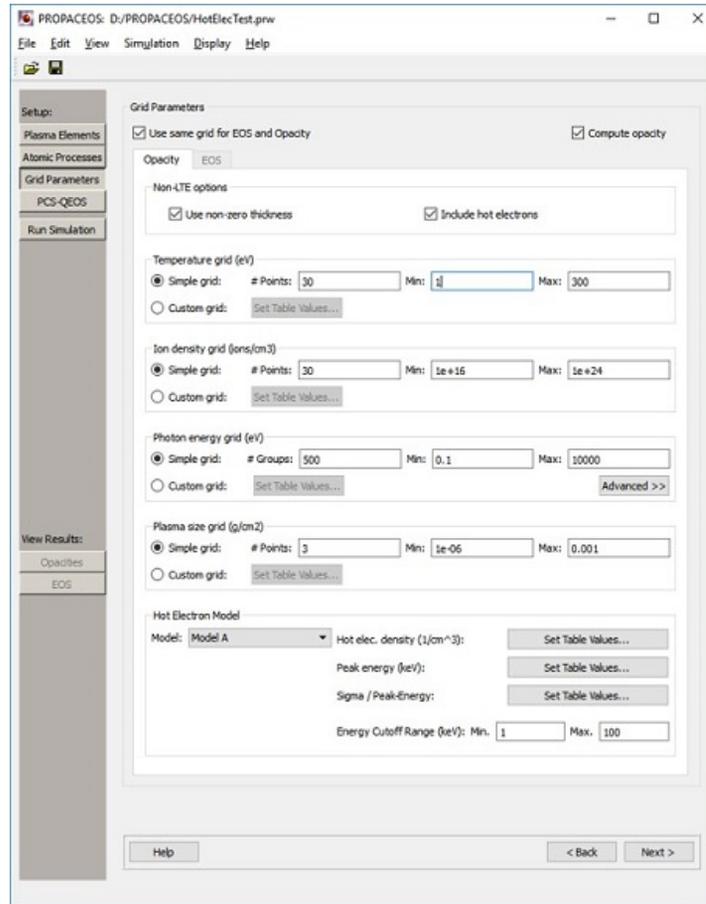
For finite size plasmas, the plasma size is specified in terms of an areal density ($\rho\ \Delta L$), and the calculation is performed for a planar plasma with thickness ΔL. When these calculations are performed, photoionization and photoexcitation processes are included in the calculation of atomic level populations.

When hot electron modeling is included, the contribution of a non-Maxwellian component to the electron distribution is included when computing atomic level populations. For hot electron modeling, currently one model is supported (Model A). For this case, the hot electron density is modeled using a Gaussian distribution function. Here, the user specifies:

- the hot electron density
- the peak energy of the distribution
- the ratio of the standard deviation (σ) to the peak energy
- the minimum and maximum range of the non-Maxwellian component of the energy distribution.

The distribution is normalized such that the total hot electron density is equal to the specified value.

- A new PROPACEOS output file format ID (ID = 9) is now available, which is used to support the use of finite plasma sizes and hot electrons.
- Plotting in EOS Results window: Updates were made to support calculations which have the additional independent variables related to plasma size and hot electron distribution. In addition, new graphics library classes are now utilized when showing the EOS data.
- Plotting in Opacity Results window: Updates were made to support calculations which have the additional independent variables related to plasma size and hot electron distribution.
- The Preferences window now has an additional tab for setting default paths for atomic data and eos/opacity data on Windows (this tab already existed on Mac and Linux).
- Bug fixes:
    - Viewing results of a very large table will no longer lead to a crash
    - Viewing results of tables with 6 or more elements no longer leads to issues (some wrong atomic values on Windows, crash on Linux and Mac)
    - Opacities button is now grayed out when a Sesame file is loaded (only available to certain users)