

Abstract Submitted  
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**The EOSTA model for opacities and EOS calculations**<sup>1</sup> AVRAHAM BARSHALOM, NRCN & Artep, JOSEPH OREG, Artep — The EOSTA model developed recently combines the STA and INFERNO models to calculate opacities and EOS on the same footing. The quantum treatment of the plasma continuum and the inclusion of the resulted shape resonances yield a smooth behavior of the EOS and opacity global quantities vs density and temperature. We will describe the combined model and focus on its latest improvements. In particular we have extended the use of the special representation of the relativistic virial theorem to obtain an exact differential equation for the free energy. This equation, combined with a boundary condition at the zero pressure point, serves to advance the LDA EOS results significantly. The method focuses on applicability to high temperature and high density plasmas, warm dens matter etc. but applies at low temperatures as well treating fluids and even solids. Excellent agreement is obtained with experiments covering a wide range of density and temperature. The code is now used to create EOS and opacity databases for the use of hydro-dynamical simulations.

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