

Abstract Submitted
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A new tabular EOS for hydrogen isotopes DIDIER SAUMON, Los Alamos National Laboratory — The Saumon-Chabrier EOS model for hydrogen has been greatly improved, expanded to cover new physical regimes, and generalized to all three isotopes of hydrogen. The new table covers $4 \leq T \leq 10^9$ K and $10^{-10} \leq \rho \leq 10^3$ g/cm³. At low temperatures, gaseous, liquid and solid molecular phases are included, as well as the monatomic solid plasma. The fluid phase is based on the chemical picture that describes interacting H₂, H, H⁺ and electrons. Quantum corrections on the dense molecular, atomic and ionic fluids are included. The plasma model considers electron degeneracy, screening, relativistic effects, as well as strong plasma coupling. Interactions between charged and neutral particles have received particular attention as they control the pressure ionization of hydrogen. Notably, we found that previous predictions of a first order “plasma phase transition” based on this type of model are inherent to their construction and are not credible. This new model does not predict such a transition. A brief overview of the model will be followed by extensive comparisons with static and dynamic compression data and ab initio simulations.

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