

Abstract Submitted
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The ionization and equation of state of fluid helium at high temperatures and densities QIFENG CHEN, LINGCANG CAI, YUNJUN GU, JUN ZHENG, FUQIAN JING, National Key Laboratory of Shock Wave and Detonation Physics Research, Institute of Fluid Physics, P. O. Box 919-102, Mianyang, Sichuan, P R China — The ionization degree is obtained from nonideal ionization equilibrium, taking into account the correlation contributions to chemical potential and the lowering of ionization energy of fluid helium due to the interactions among all particles of He, He⁺, He²⁺, and e, which is determined self-consistently by the free energy function. The composition and equations of state of dense helium plasma have been calculated in the range of density of 0-8.0 g/cm³ and temperature of 4-50 kK. This provides a basis for calculating its thermodynamic, transport, optical properties, and electrical conductivities.

Qifeng Chen
National Key Laboratory of Shock Wave and Detonation Physics Research,
Inst. of Fluid Physics, P.O. Box 919-102, Mianyang, Sichuan, P R China

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