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EOS and transport properties of dense carbon and aluminum plasmas GERALD FAUSSURIER, CHRISTOPHE BLANCARD, PATRICK RENAUDIN, CEA — The electronic and ionic structures of dense aluminum and carbon plasmas are determined self-consistently using the average-atom model SCAALP (Self-Consistent Approach for Astrophysical and Laboratory Plasmas) based on the finite-temperature density-functional theory and the Gibbs-Bogolyubov inequality. Various EOS data, such as internal energy, pressure, entropy, and sound speed, are calculated by numerical differenciation of the plasma Helmholtz free energy. The electronic electrical conductivity is obtained from the Ziman approach. We present numerical results for Hugoniot curves with non-standard density-temperature initial conditions. Comparisons with recent experiments are also presented and discussed.

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