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Ab Initio Results for the Momentum Distribution Function of the Warm Dense Electron Gas KAI HUNGER, Kiel University, TIM SCHOOF, DESY Hamburg, MICHAEL BONITZ, Kiel University — The thermodynamics of warm dense matter (WDM) have gained high interest in the past decade due to its significance for technological and astrophysical applications. Theoretically, the electrons pose the most difficulties since quantum and correlation effects are not negligible and can not be approximated with decent accuracy. Recently we have developed the first ab initio Configuration Path Integral Monte Carlo (CPIMC) [1] method for the model of the uniform electron gas (UEG) at finite temperature [2]. Here we extend the CPIMC simulations to the momentum distribution function (MDF) and the static structure factor of the UEG. These structural properties, in particular, a non-exponential high-momentum asymptotics ("quantum tail") of the MDF, are of crucial importance for scattering cross sections, transport and optical properties. Our simulations confirm the p^{-8} asymptotics that was predicted for the ground state and its relation to the so-called on-top pair distribution function [3]. We also present extensive data for the MDF of electrons in the WDM regime, including its values around the Fermi edge. [1] T. Schoof et al., Phys. Rev. Lett. 115, 130402 (2015) [2] T. Dornheim et al., Phys. Reports 744, 1-86 (2018) [3] J.C. Kimball, J. Phys. A: Math. General 8, 1513 (1975)

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