
Inhomogeneous electron gas under warm dense conditions

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Warm dense matter (WDM) is a state of matter with parameters between solids and dense plasmas. WDM is characterized by the relevance of quantum degeneracy, thermal excitations, and strong correlations. Many questions regarding the interplay of these effects in WDM remain open. In this paper, we use an externally perturbed electron gas to investigate how electronic structure and excitations are affected by thermal excitations and density inhomogeneities. The results are reported in our recent articles [1-4]. We present a study of the quality of various exchange-correlation functionals in the KS-DFT method [1,2]. In addition, we show how electronic excitations change due to strong inhomogeneity and thermal effects [3]. Based, on these results, we present a new KS-DFT based methodology for the investigation of the non-linear response of electrons across temperature regimes relevant for WDM [4].

References

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