

Abstract Submitted
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Temperature dependence of the one-electron Green's function within the cumulant formalism¹ J. J. KAS, J. J. REHR, U of Washington — Recently there has been renewed interest in the cumulant expansion for the one-electron Green's function due to its success in explaining inelastic losses and many-body effects beyond the GW approximation in x-ray photoemission and absorption spectra. For example, the approach has shown great promise in reproducing the observed multiple-plasmon satellites in the XPS of metals and semi-conductors,² as well as the satellite structure in charge-transfer systems such as CeO₂.³ Here we investigate the role of temperature on these satellite features using a finite temperature cumulant expansion for the retarded one-electron Green's function. The cumulant is related to the retarded GW self-energy, which is determined from the Matsubara Green's function and response function within the RPA. We apply the method to the uniform electron gas over a wide range of temperatures, and we discuss the implications of these results on measurements of XPS and Compton scattering, which can be used as a thermometer for warm dense matter.

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²J. Zhou et al., J. Chem. Phys. 143, 184109 (2015).

³J.J. Kas, J.J. Rehr and J.B. Curtis, Phys. Rev. B 94, 035156 (2016).

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