SFB1242

SFB 1242 Nichtgleichgewichtsdynamik kondensierter Materie in der Zeitdomäne

UNIVERSITÄT DUISBURG ESSEN

Open-Minded

10.12.2019 / 10 Uhr c.t., Raum MG 272
Campus Duisburg

Spectral Function of the Holstein Polaron at Finite Temperature

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I will present the Holstein polaron spectral function on a one dimensional ring obtained using the finite-temperature (T) Lanczos method. After a brief introduction in to basic properties of the model I will present most important features of the electron spectral function. With increasing T additional features in the spectral function emerge even at temperatures below the phonon frequency. We observe a substantial spread of the spectral weight towards lower frequencies and the broadening of the quasiparticle (QP) peak. In the weak coupling regime the QP peak merges with the continuum in the high-T limit. In the strong coupling regime the main features of the low–T spectral function remain detectable up to the highest T used in our calculations. The effective polaron mass shows a non–monotonic behavior as a function of T at small phonon frequency but increases with T at larger frequencies. The self energy remains kindependent even at elevated T in the frequency range corresponding to the polaron band while at higher frequencies it develops a distinguishable kdependence. Analytical expressions for the first few frequency moments are derived and they agree well with those extracted from numerical calculations in a wide-T regime. Finally, I will also discuss some relaxation properties of the electron coupled to various bosonic excitations [2].

References

[1] J. Bonča, S. A. Trugman, and M. Berçiu, Phys. Rev. B **100**, 094307 (2019).
[2] J. Kogoj, M. Mierzejewski and J. Bonča, Phys. Rev. Lett. **117**, 227002 (2016).

Für diese Zeit steht eine Kinderbetreuung nach vorheriger Anmeldung zur Verfügung.

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