

MP 19: Poster (Monday - Thursday)

Time: Monday 11:00–18:00

Location: H-HS VII

MP 19.1 Mon 11:00 H-HS VII

Correlational entropy by nonlocal quantum kinetic theory —
•KLAUS MORAWETZ — Münster University of Applied Sciences, 48565
Steinfurt, Germany — International Institute of Physics - UFRN,
Campus Universitário Lagoa nova, 59078-970 Natal, Brazil

The nonlocal kinetic equation unifies the achievements of the transport in dense quantum gases with the Landau theory of quasiclassical transport in Fermi systems. Large cancellations in the off-shell motion appear which are hidden usually in non-Markovian behaviors [1]. The remaining corrections are expressed in terms of shifts in space and time that characterize the non-locality of the scattering process [2]. In this way quantum transport is possible to recast into a quasi-classical pic-

ture [3]. The balance equations for the density, momentum, energy and entropy include besides quasiparticle also the correlated two-particle contributions beyond the Landau theory [4]. The medium effects on binary collisions are shown to mediate the latent heat, i.e., an energy conversion between correlation and thermal energy. For Maxwellian particles a sign change of the latent heat is reported at a universal ratio of scattering length to the thermal De Broglie wavelength. This is interpreted as a change from correlational heating to cooling [5].

[1] Ann. Phys. 294 (2001) 135, [2] Phys. Rev. C 59 (1999) 3052, [3] “Interacting Systems far from Equilibrium - Quantum Kinetic Theory”, Oxford University Press, (2017), ISBN 9780198797241, [4] Phys. Rev. E 96 (2017) 032106, [5] Phys. Rev. B 97 (2018) 195142