

Numerical methods in quantum kinetic theory

Lorenzo Pareschi

Universita di Ferrara

Abstract: We derive accurate numerical methods for the quantum Boltzmann equation for a gas of interacting bosons. The schemes preserve the main physical features of the continuous problem, namely conservation of mass and energy, the entropy inequality and generalized Bose-Einstein distributions as steady states. These properties are essential in order to develop schemes that are able to capture the energy concentration behavior of bosons. In addition we develop fast algorithms for the numerical evaluation of the resulting quadrature formulas which allow the final schemes to be computed only in $O(N^2 \log_2 N)$ operations instead of $O(N^3)$.