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Invariant measures for nonlinear Schrödinger equations as limit of many body quantum states

We prove that Gibbs measures associated with nonlinear Schrödinger equations arise as high-temperature limit of appropriately modified thermal states in many-body quantum mechanics. In dimensions $d=2,3$ these Gibbs measures are supported on singular distributions and Wick ordering of the interaction is necessary. Our proof is based on a perturbative expansion in the interaction, organised in a diagrammatic representation, and on Borel resummation of the resulting series. This is a joint work with J. Fröhlich, A. Knowles and V. Sohinger.