Theoretical Quantum Physics

Group Seminar

04:00 PM
26/08/2020

Online (Zoom)

Entanglement in Fermion Systems

Nicolás Gigena
National University of La Plata

Abstract

Quantum entanglement and identical particles are two fundamental concepts in quantum mechanics. Entanglement has been extensively studied in the last decades within the field of quantum information because of its role as a resource in particular quantum information processing tasks. Nonetheless, most of the contributions on the subject have been devoted to the study of composite systems with distinguishable constituents, with the case of indistinguishable fermions receiving increasing attention only in the last years.

Extending the notion of entanglement to systems of indistinguishable particles is not a straightforward task and different approaches have been taken. In this talk we summarize our work on the subject and make the case for identifying entanglement in fermion systems with correlations beyond symmetrization. In this picture the amount of entanglement in a pure state of such a system is linked to its departure from a Slater determinant, which can be quantified by the degree of mixedness of the eigenvalues of its associated single particle density matrix. The relation of this entanglement with that between modes and that between distinguishable particles is addressed, along with its quantification in the ground state of the BCS and Lipkin models.

Christian Schilling
c.schilling@physik.uni-muenchen,de
Theresienstr. 37

Emmy Noether-Programm