



Contribution ID: 971

Type: **Talk**

Statistical superdegeneracy and quantum foundations

Thursday 24 August 2017 15:30 (30 minutes)

The foundations of quantum mechanics have always been closely tied to statistical physics; historically, of course, the former subject began through wrestling with unresolved issues in the latter. This presentation introduces a new concept, statistical superdegeneracy (unrelated to magnetism and band structures) that may have implications for quantum foundations. As one possible motivation, consider population inversion (e.g., in lasers). It is a nonequilibrium phenomenon owing to the dominance of the Boltzmann factor in determining state occupancy under thermal equilibrium. State degeneracy, while adding detail, is assumed to be of secondary importance. In this paper, a new type of degeneracy is explored, one that increases sufficiently rapidly with energy so as to dominate the Boltzmann exponential, thereby leading to new phenomena, like population inversion at thermal equilibrium as well as stationary quantum currents. Physical systems that might exhibit this anomalous degeneracy are proposed, and ramifications for quantum and statistical foundations are discussed.

Topic:

Mini-workshop: Quantum Foundations and Quantum Information

Summary

Primary author: Dr SHEEHAN, Daniel (Dept. Physics, University of San Diego)

Presenter: Dr SHEEHAN, Daniel (Dept. Physics, University of San Diego)

Session Classification: Workshop on Quantum Foundations and Quantum Information

Track Classification: Workshop on Quantum Foundations and Quantum Information