Contribution ID: **196** Type: **Talk**

【553】Operational reconstruction of quantum particle statistics

Friday, 3 September 2021 11:45 (15 minutes)

A fascinating fact about the collective behavior of indistinguishable quantum particles is the existence of only two types of statistics: bosonic and fermionic, characterized by the exchange symmetry of their associated quantum states. So far, all attempts to explain the origin of these symmetries resort on oblivious assumptions added to the abstract quantum formalism (e.g. dimensionality of space). Hereby we introduce an information-theoretic study of particle statistics in the space of abstract modes. We show that there are infinitely many statistics compatible with the unitary symmetry and the Fock space structure, with bosons and fermions as special cases which can be singled out by a set of simple operational principles.

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Session Classification: Quantum Information and Quantum Computing

Track Classification: Quantum Information and Quantum Computing