

VII Leopoldo García-Colín Mexican Meeting on Mathematical and Experimental Physics



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CARLOS PINEDA: A quantum framework for coarse graining and fuzzy measurements

Thursday, 20 February 2020 18:00 (30 minutes)

We present a quantum framework for coarse graining and fuzzy measurements in a multiparticle system, based solely on what might be physically measured. For example the case of coarse graining, we assume that the detectors can measure only randomly selected particles with a physically motivated distribution. For the case of fuzzy measurements, we assume that the detectors might be placed incorrectly, leading to misidentification of some particles. In the space of states, both situations induce completely positive maps that lead to a shrinking of the state space. These maps are studied in detail; physical quantities such as the measurable entanglement (and thus the ability to perform tasks such as teleportation), and purity are considered. In addition, by considering the symmetries and spectra of the maps, we calculate the shrinking rate of the space of states. Finally, we consider the many particle limit and find that only an exponentially small subset of the state space is observable if one has imperfect detectors. In the limit of infinite particles, this set coincides with the many particle coherent states, and thus we call this subset the classical space.

Session Classification: SHORT TALKS

Track Classification: SYMPOSIUM ON SCATTERING, QUANTUM AND CLASSICAL TRANSPORT