

A new class of entropy-power-based uncertainty relations

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Joint work with: Jacob A. Dunningham, Anthony Hayes

In my talk I will use the concept of entropy power to derive a new one-parameter class of information-theoretic uncertainty relations for pairs of observables in an infinite-dimensional Hilbert space. This class constitute an infinite tower of higher-order cumulant uncertainty relations, which allows in principle to reconstruct the underlying distribution in a process that is analogous to quantum state tomography. I will illustrate the power of the new class by studying Schroedinger cat states and the Cauchy-type heavy-tailed wave function. Finally, I try to cast some fresh light on the black hole information paradox.

Related works: [1] P. Jizba, J.A. Dunningham and J. Joo, Special Relativity Induced by Granular Space, *Annals of Physics* 355 (2015) 87 [2] P. Jizba, J.A. Dunningham, A. Hayes and Y. Ma, A new class of entropy-power-based uncertainty relations, submitted to PRL [3] P. Jizba, H.Kleinert and F.Scardigli, Uncertainty Relation on World Crystal and its Applications to Micro Black Holes, *Phys. Rev. D* 81 (2010) 084030.