HARVARD UNIVERSITY
17 Oxford Street
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Tuesday, May 5, 2020
10:00 a.m.

Mathematical Picture Language Seminar
Join by Zoom at
https://harvard.zoom.us/j/779283357

"The information in a wave"

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Abstract: Suppose that some information is transmitted by an undulatory signal. In Classical Field Theory, the stress-energy tensor provides the energy-momentum density of the wave packet at any time. But, how to measure the information, or entropy, carried by the wavepacket in a certain region at given time?

Surprisingly, one can answer the above (entirely classical) question by means of Operator Algebras and Quantum Field Theory. In fact, in second quantisation a wave packet gives rise to a sector of the Klein-Gordon Quantum Field Theory on the Rindler spacetimeW. The associated vacuum noncommutative entropy of the global von Neumann algebras of W is the entropy of the wave packet in the wedge region W of the Minkowski spacetime. One can then read this result in first quantisation via a notion of entropy of a vectorof a Hilbert space with respect to a real linear subspace.

I give a path to the above results by an overview of some of basic results in Operator Algebras and Quantum Field Theory and of the relation with the Quantum Null Energy Inequality.