

Entropy in a Coherent Universe: Quantum Information in the Action of the Cosmic SuperWeb

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von Neumann of (thermal) quantum entropy fame purportedly responded to Shannon asking what his novel classical information content measure should be called: paraphrasing, entropy, nobody understands it anyway. Nowadays information entropy and thermal entropy have merged as ideas, and expanded to encompass phase info as well as counting info, aka quantum information. Its development and transport through all of the great cosmic epochs of instability accompanying transitions of phase is a unifying story of the Universe. This is a big topic which I will meander through, from the speculative emergence of coherence, through an inflation era, its preheating end in the matter-entropy burst, with attention on the cosmic neutrino background decoupling, cosmic photon thermal decoupling and its Compton scattering decoupling, and entropy development and transport in the gravitationally-unstable nonlinear cosmic web. With applications to observable entropic relics and the cosmic parameters we derive from them, such as the CnuB, CMB, the cosmic infrared background, line intensity mapping, and the thermal state of clusters, groups and the IGM. Whew, and that's not all: one quest is for information-laden Planck-epoch non-Gaussianities, scalar and tensor, beyond Planck the satellite, and towards LiteBird.

Primary author: BOND, J. Richard

Presenter: BOND, J. Richard

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