

# Gravity related spontaneous decoherence: from Wheeler-Bekenstein-Hawking to optomechanics

*Friday, 27 March 2015 12:15 (45 minutes)*

The inception of a universal gravity-related irreversibility took place originally in quantum cosmology but it turned out soon that a universal non-unitary dynamics is problematic itself. Independent investigations of the quantum measurement postulate clarified that a non-unitary dynamics is of interest already in the non-relativistic context. An intricate relationship between Newton gravity and quantized bulk matter might result in universal non-relativistic violation of unitarity - also called spontaneous decoherence. The corresponding gravity-related spontaneous decoherence model is now on the verge of detectability in optomechanical experiments. It is also a toy-model of cosmic quantum-gravitational non-unitarity, illuminating that the bottle-neck of quantum-gravity is the quantum measurement postulate instead of quantum cosmology.

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**Session Classification:** Gravity and Cosmology