Ko Sanders
FAU Erlangen

Title: Quantum Inequalities in Curved Spacetimes

Abstract:
In classical General Relativity, the coupling of matter and geometry leads to beautiful mathematical results, such as singularity theorems and many others. In the presence of quantum matter, however, all these results must be reexamined, because the assumptions that go into them typically fail. In particular, classical Energy Conditions, pioneered by Penrose to prove his 1965 Singularity Theorem, are a common assumption in many results of mathematical relativity, but they fail for quantum fields. Nevertheless, a weaker type of condition, called Quantum Energy Inequalities, has been verified in many quantum field theory models. In this talk I will review these Quantum Energy Inequalities and related inequalities, starting with a general overview of the physical motivation and mathematical framework for quantum fields in curved spacetimes.