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Quantum energy inequalities and integrable quantum field theories

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Many results in general relativity rely crucially on classical energy conditions inflicted on the stress-energy tensor. Quantum matter, however, violates these conditions since its energy density can become arbitrarily negative at a point. Nonetheless quantum matter should have some reminiscent notion of stability, which can be captured by the so-called quantum (weak) energy inequalities (QEIs), lower bounds of the smeared quantum-stress-energy tensor. QEIs could be proven in many free quantum field theory (QFT) models on both flat and curved spacetimes. In interacting theories only few results exist. We are here presenting numerical and analytical results on QEIs in interacting integrable QFT models in 1+1 dimension, in particular the $O(N)$ -nonlinear-sigma and sinh-Gordon model at 1- and 2-particle level.

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