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The Quantum focusing Conjecture and the Improved Null Energy Condition

By rearranging its terms, the Quantum Focusing Conjecture (QFC) can be viewed as a quantum energy condition, and we can consider various limits. I will review the status of energy conditions in general relativity and the QFC. Of specific interest is a restricted version where the quantum focusing vanishes $\Theta \rightarrow 0$, which has been proven for Braneworld scenario.

As a result, I derive an improved quantum null energy condition (INEC), $T_{kk} \geq \frac{\hbar}{2\pi\mathcal{A}} \left(S''_{out} - \frac{1}{2}\theta S'_{out} \right)$, that can be proven with field theory techniques. I sketch the beginning of a proof, and briefly discuss possible interpretations in the absence of one.

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