

# Mode-Sum Renormalization in Black Hole Spacetimes

*Tuesday, 29 August 2023 10:30 (40 minutes)*

It is well known that the expectation value of the stress-energy tensor for a quantum field must be renormalized. While there exists a well-understood formal resolution to the renormalization problem, the practical implementation is technically difficult in black hole spacetimes. The first successful computation of the renormalized stress-energy tensor in a black hole spacetime dates back to seminal work in the 1980s by Candelas and Howard. However, there had been little improvement on their prescription in the intervening decades, despite some drawbacks to their method. In recent years, alternative approaches to computing renormalized stress-energy tensors in black hole spacetimes have emerged. I will discuss one such scheme that has proved very efficient in static black hole spacetimes in arbitrary dimensions. As an application of this method, I will also present results for the renormalized stress-energy tensor for scalar fields in the Hartle-Hawking, Unruh and Boulware states in the Reissner-Nordstrom spacetime.

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**Session Classification:** Morning session 1