A novel method for renormalization in quantum field theory in curved space-time

Gabriel Freitas Silva, Marc Casals
Centro Brasileiro de Pesquisas Físicas, Brazil

In quantum field theory in curved space-time, the expectation value of some physical quantities must be renormalized. The renormalization method that is usually implemented in the literature in principle only applies for static, spherically-symmetric space-times. However, it does not readily generalize to other types of space-time. We present a novel implementation of the renormalization procedure which may be used in the future for more general space-times such as Kerr black hole space-time. As an example, we apply our method to the renormalization of the square of the field operator for a scalar field in Bertotti-Ro