

Chemical Potential in Quantum Black Holes

Gravitational physics and condensed matter theory provide good motivation to investigate strongly coupled quantum theories in the presence of chemical potentials and curved background geometries. We study systems in 2+1 dimensions consisting of a defect that sources an electric charge, or a magnetic flux, of a $U(1)$ field. We find the effects induced by these defects on quantum conformal fields. Perhaps more intriguingly, we can also hide the defects inside the horizon of a black hole, where they will still have an effect on the quantum conformal fields outside.

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