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Thermodynamics of Charged Black Hole

Tuesday, 6 July 2021 06:30 (25 minutes)

This talk investigates thermodynamics, quasi-normal modes, thermal fluctuations and phase transitions of Reissner-Nordstrom black hole with the effects of non-linear electrodynamics. We first compute the expressions for Hawking temperature, entropy and heat capacity of this black hole and then obtain a relation between Davies point and quasi-normal modes with non-linear electrodynamics. We also observe the effects of logarithmic corrections on uncorrected thermodynamic quantities such as entropy, Hawking temperature, Helmholtz free energy, internal energy, Gibbs-free energy, enthalpy and heat capacity. It is found that presence of non-linear electrodynamics parameter induces more instability in black holes of large radii. Finally, we analyze the phase transitions of Hawking temperature as well as heat capacity in terms of entropy for different values of charge, horizon radius and coupling parameter. We obtain that Hawking temperature changes its phase from positive to negative for increasing values of charge and horizon radius while it shows opposite trend for higher values of coupling parameter. The heat capacity changes its phase from negative to positive for large values of charge, horizon radius and coupling parameter.

Primary author: SHARIF, Muhammad

Presenter: SHARIF, Muhammad

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