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Thermal Mediated Phase Transition in Gauss-Bonnet Gravity

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In this work, we will be introducing so called "thermalons"and studying them in 5 dimentional Gauss-Bonnet Gravity. Thermalons can mediate phase transitions between different vacua in higher curvature gravity, potentially changing the asymptotic structure of the spacetime. Treating the cosmological constant as a dynamical parameter, we study these phase transitions in the context of extended thermodynamic phase space. We find that in the AdS to dS case, thermal AdS can only undergo a phase transition if it is below the Nariai limit. The solutions found beyond Nariai are interpreted as "unphysical". We also find that thermal AdS space can undergo a phase transition to an asymptotically flat black hole geometry. In the context of AdS to AdS transitions, we comment on the similarities and differences between thermalon transitions and the Hawking-Page transition.

Primary authors: MANN, Robert (University of Waterloo); HENNIGAR, Robie; MBAREK, Saoussen (University of Waterloo)

Presenter: MBAREK, Saoussen (University of Waterloo)

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