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The Black hole IR triangle (Nava Gaddam)

Saturday 8 February 2025 12:15 (45 minutes)

Speaker: Nava Gaddam

Abstract:
I will argue that there is an emergent infrared triangle near the horizon of a black hole, analogous to the one in flat space. In scalar QED in a Schwarzschild background, I will show that the Ward identities corresponding to near-horizon asymptotic symmetries match exactly with a new emergent leading soft photon theorem that can be derived in an effective field theory near the horizon. Finally, the soft factor is related to a near-horizon memory effect via a Fourier transform. I will argue that the story generalises to gravitational perturbations. I will conclude with speculations on the impact of these soft modes on the validity of effective field theory in quantum gravity.