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Exploring Scalar Field Late-Time Power-Law Decay Rates Within A Black Hole Event Horizon IZAK THUESTAD, UMass Dartmouth — Computational simulations were performed on the local PS3 cluster at UMass Dartmouth to explore the behavior of late time power law decay rates for scalar fields within a black hole event horizon. This was done utilizing a novel coordinate system that allows for a smooth transition through the radius with the initial aim of expanding the numerical confirmation of Price Law. This law provides a means to calculate the late time behavior of scalar fields for Schwarzschild black holes. The decay rates predicted by Prices Law are independent of the spatial location with respect to the horizon. Initial simulations reveal a region at Radius = 1M (natural units) in which the expected decay rates for odd modes were greater than expected. A new code was developed that provides a deeper exploration for the time evolution of this ring down behavior and results from this code reveal that even-modes undergo a similar transition at key radial locations within the horizon not equal to R = 1M. Currently these numerical methods are being used to search for violations of Prices law outside of the event horizon. Exploring this behavior is necessary in order to develop our understanding of black holes and the fundamental processes that regulate such behavior.

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