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Polynomial Decay for the Klein-Gordon Equation on the Schwarzschild Black Hole

We will start with a review of previous instability results concerning solutions to the Klein-Gordon equation on rotating Kerr black holes and the corresponding conjectural consequences for the dynamics of the Einstein-Klein-Gordon system. Then we will discuss recent work where we show that, despite the presence of stably trapped timelike geodesics on Schwarzschild, solutions to the corresponding Klein-Gordon equation arising from strongly localized initial data nevertheless decay polynomially. Time permitting we will explain how the proof uses, at a crucial step, results from analytic number theory for bounding exponential sums. The talk is based on joint work(s) with Federico Pasqualotto and Maxime Van de Moortel.