Gravitational Physics
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I N V I T A T I O N

as part of the Gravitational Physics Literature Seminar

to the talk by

Sam COLLINGBOURNE
&
Jan SBIERSKI
(University of Edinburgh)

on

"Two linear instabilities in general relativity"

Abstract:

This is a joint talk by Sam Collingbourne and Jan Sbierski.

The first half concerns Gregory—Laflamme (GL) instabilities which occur at the level of linearised gravity. Heuristic and numerical evidence suggests that GL instabilities plague black holes in dimensions greater than 4 which have an event horizon that has one direction that is large compared to all others. Sam will discuss a direct mathematical proof of the Gregory—Laflamme instability for the 5D Schwarzschild black string. The proof relies upon reducing the linearised vacuum Einstein equation to a Schrödinger equation to which direct variational methods can be applied.

The second half of the talk concerns the blue-shift instability in the interior of rotating Kerr black holes at the level of linearized gravity. This instability is intimately connected to Penrose's strong cosmic censorship conjecture. In contrast to the GL instability, this instability is weak in the sense that the C^0 norms of metric perturbations do not grow. Jan will discuss a mathematical result on the blue-shift instability, illustrate the mechanism by a toy example, and, if time permits, discuss some elements of the proof.

Time: **Wednesday, 2 April 2025, 2:15 p.m.**

Location: **Seminarraum A, Währinger Straße 17, 1090 Vienna, 2nd floor**

https://univienna.zoom.us/j/6540036841?pwd=SytyVkZJZzNyRG9lMm13ejlHeHRRUT09

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