

Friedrich-Hirzebruch-Kolloquium

On the stability of rotating black holes

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14 December 2023 | 4:15 pm | Lecture hall M5

In General Relativity, spacetime is a Lorentzian manifold whose curvature is sourced by the matter content through nonlinear partial differential equations - the Einstein equations. Due to their nonlinear character, even in the absence of matter, there are solutions with nontrivial geometry, such as black holes.

A long standing conjecture in the field posits that stationary black holes should be stable as solutions to the Einstein vacuum equation. A remarkable result of Dafermos, Holzegel, Rodnianski and Taylor (2021) established the conjecture for spherically symmetric black holes. This talk aims to give an overview of the state of the conjecture for rotating black holes.

The talk begins with a gentle introduction to General Relativity and black holes. We will then describe the key insights from Geometry and Analysis that have allowed for progress on this problem. Some of the results presented are joint work with Yakov Shlapentokh-Rothman (Toronto) and Marc Casals (Leipzig/UCD/CBPF).

After the talk there will be a reception at the SRZ Lounge, Orléans-Ring 12, 2nd floor.