CIDMA CENTRO DE I&D EM MATEMÁTICA E APLICAÇÕES
CENTER FOR R&D IN MATHEMATICS AND APPLICATIONS

universidade de aveiro

Gravitational Geometry and Dynamics Group Seminar

Wed., February 11, 2026, at 11h00.

Room: Sala Sousa Pinto and **Teams ID:** 355 867 788 115 15

(*Password: contact jnicoules@ua.pt*)

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How to extract energy from a rotating Black Hole

Black holes are not merely cosmic sinks; they are the universe's most efficient reservoirs of energy, characterized by their mass, angular momentum (spin), electric charge, and surrounding magnetic fields. We explore the theoretical frameworks for tapping into these vast reserves. We establish the fundamental mechanics of energy extraction by deriving solutions for various spacetime configurations.

Central to our analysis is the role of the ergosphere and the inner light surface, where the frame-dragging effect allows for the existence of negative energy states relative to an observer at infinity. We provide a detailed examination of energy extraction via the fragmentation of negative energy plasmoids within the accretion flow, a process of high-energy outflow. Finally, we address the regulatory mechanisms of these systems, discussing theoretical methods to halt or reverse accretion, thereby transitioning the black hole from a growth phase to a pure energy-radiation engine.

More about Gr@v at: gravitation.web.ua.pt

The Gr@v Seminars are supported in part by the FCT – Portuguese Foundation for Science and Technology, through projects 2022.04560.PTDC and 2024.05617.CERN and through CIDMA – Center for Research and Development in Mathematics and Applications, under the Portuguese Foundation for Science and Technology (FCT, https://ror.org/00snfqn58) Multi-Annual Financing Program for R&D Units, grants UID/4106/2025 and UID/PRR/4106/2025 (https://doi.org/10.54499/UID/04106/2025).

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