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Scalar Fields, Black Holes and Spherical Coordinates

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Black holes (BH) are the fundamental particles of gravity, in the framework of General Relativity. They are extremely simple objects and can host several fascinating phenomena. Amongst these is superradiance, a mechanism through which rotational energy can be extracted from BHs by bosonic fields. Such mechanisms can be used to explore our universe, looking for new types of matter beyond the predictions of the Standard Model.
We explore the concepts of superradiance and superradiant instability of bosonic fields around BHs, as well as novel ways to study these phenomena numerically.

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