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F. Serrano: Superradiance and Hawking evaporation in the string axiverse

Monday 19 December 2022 15:00 (15 minutes)

In the string axiverse scenario, light primordial black holes may spin up due to the Hawking emission of a large number of light (sub-MeV) axion-like particles (ALPs). We show that this may trigger superradiant instabilities associated with heavier ALPs during the black hole?s evolution, and study the coupled dynamics of superradiance and evaporation. We find, in particular, that the black hole mass-spin distribution should follow the superradiance threshold condition for black hole masses below the value at which the superradiant cloud forms, for a given heavy ALP mass. Furthermore, we show that the decay of the heavy ALPs within the superradiant cloud into photons may lead to a distinctive line in the black hole?s emission spectrum, superimposed on its electromagnetic Hawking emission.

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