Contribution ID: **3** Type: **not specified**

Primordial Black Hole Hot Spots and Nucleosynthesis

Tuesday 20 May 2025 16:30 (20 minutes)

Upon their evaporation via Hawking radiation, primordial black holes (PBHs) may deposit energy in the ambient plasma on scales smaller than the typical distance between two black holes, leading to the formation of hot spots around them.
In this talk (based on the recent work https://arxiv.org/pdf/2501.05531), I will consider how the corresponding rise of the local temperature during the evaporation may act as a shield against the release of low-energy photons, affecting PBH's capacity to dissociate light nuclei after Big-Bang Nucleosynthesis through photodissociation. Additionally, I will show the different ways PBH hot spots affect the flux of low-energy photons expected from PBH evaporation. We find that such effects turn out to be particularly relevant to the physics of photodissociation during Big-Bang Nucleosynthesis for PBHs with masses between $10^{11}g$ and $3 \times 10^{12}g$. Finally, I will comment on how the magnitude of these effects is highly dependent on the specific shape of the temperature profile around PBHs and its time evolution, and argue that this underscores the necessity for a comprehensive study of PBH hot spots and their dynamics in the future.

Authors: ALTOMONTE, Clelia (King's College London); HEURTIER, Lucien (King's College London); Prof. FAIRBAIRN, Malcolm (Physics, King's College London)

Presenter: ALTOMONTE, Clelia (King's College London)

Session Classification: PBHs signatures