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The inflation trilogy and primordial black hole dark matter

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We propose an inflation scenario with three independent stages of cold, warm and thermal inflation, respectively, driven by different scalar fields, motivated by the large number of such fields predicted by most extensions of the Standard Model. We show, in particular, that the intermediate period of warm inflation naturally leads to large density fluctuations on small scales, which can lead to primordial black hole formation in the mass window where they may account for all dark matter. This type of scenario yields a distinctive primordial black hole mass function due to the final period of thermal inflation, which dilutes the abundance of very light black holes.

Primary authors: FERRAZ, Paulo (University of Coimbra); ROSA, João (University of Coimbra)

Presenter: FERRAZ, Paulo (University of Coimbra)

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