

Dark matter and black holes



Contribution ID: 215

Type: **not specified**

Dark Matter and the Formation of Direct Collapse Supermassive Black Holes

Tuesday 2 December 2025 10:30 (30 minutes)

The surprising abundance and properties of supermassive black holes (SMBHs) observed at high redshifts have opened a new window into the interplay between cosmology and dark matter physics. While explaining how SMBHs are assembled within the first few hundred million years after the Big Bang remains a major challenge, an attractive route is the direct collapse of pristine, metal-free gas clouds, provided that catastrophic cooling and fragmentation of the cloud are effectively suppressed. In this talk, I will present several mechanisms through which the dark sector can give rise to the conditions necessary for direct collapse. Energy injection from evaporating primordial black holes or photon emission from decaying relic particles, such as axion-like particles or Majorons, can sustain the monolithic collapse of protogalaxies, suggesting a potential link between the origin of early SMBHs and the underlying physics of the dark sector.

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Session Classification: Plenaries 4-5:George Fuller and Yifan Lu