

Unusual black hole (MoM-BH-1)

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Why in News?

- The object is designated as *MoM-BH-1**, existed just 660 million years after the Big Bang.
- **Identified by** - Astronomers (led by MIT researchers) during the *Mirage or Miracle (MoM)* survey.
- At first glance, the object resembles an enormous star roughly the size of our solar system.
- However, it shines **100 billion times brighter** than any normal star could physically generate through nuclear fusion.
- **Internal Structure** - The object consists of a central supermassive black hole (roughly 100,000 to 1 million solar masses) wrapped inside an ultra-dense, turbulent cocoon of hydrogen gas.
- **Gas vs. Dust Reddening** - Astronomers typically assume that such deeply reddened cosmic objects are obscured by heavy concentrations of cosmic dust.
- **Spectral Anomaly**- *MoM-BH*-1* displayed an exceptionally deep **Balmer break** (a sharp drop in light intensity across specific wavelengths) along with unique hydrogen absorption features that ruled out ordinary stellar populations.
- **The Findings** - Modeling revealed that the object contains **very little dust**.
- Instead, the extreme density of the surrounding hydrogen gas itself absorbs, scatters, and re-emits the radiation from the central black hole, creating the deep red, compact appearance without requiring large amounts of dust.
- **Missing Link** - Since its launch, JWST has baffled astronomers with images of mysterious, compact "little red dots" (LRDs) in the early universe.
- **Pure Signature** - *MoM-BH*-1* acts as a "naked" template—because its emission completely outshines its host galaxy, it confirms that LRDs are likely growing black holes encased in dense gas cocoons rather than dust-heavy galaxies.



Reference

[The Hindu | Unusual blackhole](#)



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