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# Supermassive black holes from dark matter

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The origin of high-redshift supermassive black holes (SMBHs) has been an intriguing mystery in astronomy and cosmology. Recent observations from James Webb Space Telescope further challenged our previous understanding about their formation mechanism. A promising solution to this problem is the direct collapse black holes from primordial metal-free clouds, which often requires stringent conditions to prevent the fragmentation of the cloud. In this talk, I will show that such conditions for direct collapse can be achieved in several astroparticle physics settings. In particular, the heating from primordial black hole evaporation or radiation from axion like particle decay can effectively prevent the gas cloud from fragmentation and trigger the direct collapse, thus providing SMBH seeds at much earlier time.

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