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Primordial black hole tower: Dark matter, earth-mass, and LIGO black holes

We investigate a possibility of primordial black hole (PBH) formation with a hierarchical mass spectrum in multiple phases of inflation. As an example, we find that one can simultaneously realize a mass spectrum which has recently attracted a lot of attention, stellar-mass PBHs ($\sim \mathcal{O}(10)M_{\odot}$) as a possible source of binary black holes detected by LIGO/VIRGO collaboration, asteroid-mass ($\sim \mathcal{O}(10^{-12})M_{\odot}$) as a main component of dark matter, and earth-mass ($\sim \mathcal{O}(10^{-5})M_{\odot}$) as a source of ultrashort-timescale events in OGLE microlensing data. The recent refined swampland conjecture may support these multi-phase inflationary scenario with hierarchical mass PBHs as a transition

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