

# A fate of catalyzed first order phase transition -black holes from primordial black holes-

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It has been discussed that primordial black holes (PBHs), as impurities in the early universe, may have played an important role in the cosmological first-order phase transition (FOPT). Assuming that vacuum bubbles nucleate only around the PBHs, we discuss a unique phenomenology of FOPT. If the number of PBHs within one Hubble volume is smaller than unity at the time of bubble nucleation, each true-vacuum bubble catalyzed around them can expand to the Hubble size, and the universe is eventually filled with true vacuum much after nucleation. This super-slow transition predicts enhanced gravitational wave signals from bubble collisions and can be tested in future observations. Moreover, the remaining rare false vacuum patches give birth to baby BHs, which can account for the abundance of dark matter in our universe.

**Primary author:** KUME, Jun'ya (University of Padova, Istituto Nazionale di Fisica Nucleare Sezione di Padova)

**Presenter:** KUME, Jun'ya (University of Padova, Istituto Nazionale di Fisica Nucleare Sezione di Padova)