

OSPREY(Operator learning for Secondary Primordial black hole Radiation Emission Yield)

Tuesday, 19 August 2025 19:50 (5 minutes)

BlackHawk is a widely used tool for computing the secondary spectra of particles emitted via Hawking radiation from evaporating black holes. In order to account for particle hadronization and decay processes, it employs different computational backends—such as Hazma, PYTHIA, and HDMSpectra—depending on the energy scale of the initial emission. While effective in separate regimes, this hybrid approach introduces inconsistencies and interpolation ambiguities in the overlapping energy regions where the validity of multiple methods overlaps. To address this limitation, we develop a unified framework based on operator learning techniques, OSPREY(Operator learning for Secondary Primordial black hole Radiation Emission Yield). By training a neural operator on the combined datasets, we construct a surrogate model that consistently captures the secondary spectrum over the entire energy range. Our approach improves the continuity and accuracy of the spectrum, making it suitable for precision studies in both astrophysical and phenomenological applications involving Hawking radiation.

Primary author: PARK, Mingi (Yonsei University)

Presenter: PARK, Mingi (Yonsei University)

Session Classification: Poster session