

Primordial black holes, first order phase transitions, and superradiance

Friday, September 8, 2023 12:00 PM (30 minutes)

One of the main tensions in cosmology is that of the identity of dark matter. Primordial black holes (PBHs) are a longstanding candidate that has garnered a tremendous amount of attention and re-examination in recent years due to possible connections with gravitational wave signatures and regions of parameter space where they can form all of the dark matter, while well-studied WIMP candidates continue to not be found at direct detection experiments. I will discuss my current work regarding PBHs and their interplay with the phenomenon of superradiance, which provides an avenue for exploration of beyond the Standard Model physics through the production of new light particles around a rotating black hole, Hawking radiation, and gravitational waves. I will also address PBH formation mechanisms at the end of first order phase transitions, and their connections to early universe cosmology and possible observations at current and future gravitational wave observatories.

Presenter: Prof. DENT, James (Sam Houston State University)