

Messengers of the very early universe: Gravitational Waves and Primordial Black Holes



Contribution ID: 52

Type: **Invited Talk**

GW and PBH from sharp turns in axion monodromy inflation

Monday, 12 December 2022 16:00 (30 minutes)

Large and sharp turns in multifield inflation are attractive from the phenomenological point of view, but are difficult to obtain in supergravity. It can be shown that large and sharp turns can be naturally realised due to transient violations of slow-roll in axion monodromy inflation in SUGRA. In this setup, the scalar power spectrum can have a peaked profile with resonant oscillations at small scales with large peak amplitude ~ 0.01 . Such large power spectra can lead to abundant production of PBHs and characteristic oscillatory spectra of GW sourced by the scalar fluctuations. This model is one of the first concrete realisations of resonant features in the power spectra, which are imprinted in the induced GW spectrum as well. For suitable choices of the model parameters, inflation can sustain for ~ 55 -65 e-folds, leading to abundant production of very light PBH and large induced GW spectrum for a wide range of frequencies. These GW spectra can be large and wide with characteristic resonant oscillations, which can be probed by upcoming surveys such as LISA.

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Session Classification: 12th afternoon session (part 1)