

My research interests mainly focus on the physics of the early universe, especially on the evolution of primordial density perturbations, and that of dark energy. We have explored in detailed on the inflationary magnetogenesis, and the possible mechanism of creating the primordial blackhole by the curvature perturbation beyond the cosmic horizon. We have also set up a numerical scheme for a generalized phenomenological approach to analyzing the unfolding of the cosmic background, so as to alleviate the Hubble tension from the recent observational data.

### Techniques used in study

Cosmology; Relativistic perturbation theory; Numerical calculations.

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### Funding:

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Snapshots of the evolution of the curvature perturbation in the course of the ultraslow-roll inflation, timed by successive e-folds  $N = 32, 33, 34, 35, 36, 37, 38, 60$ .

### Publications

- Shu-Lin Cheng, Wolung Lee\* and Kin-Wang Ng "Superhorizon curvature perturbation in ultraslow-roll inflation" Phys. Rev. 99, 063524 (2019).
- Shu-Lin Cheng, Wolung Lee\* and Kin-Wang Ng "Primordial black holes and associated gravitational waves in axion monodromy inflation" Journal of Cosmology and Astroparticle Physics, 07, 001 (2018).
- Chia-Chun Chang, Wolung Lee\* and Kin-Wang Ng "Spherical collapse models with clustered dark energy" Physics of the Dark Universe, 19, 12- 20 (2018).
- Shu-Lin Cheng, Wolung Lee\* and Kin-Wang Ng "Production of high stellar-mass primordial black holes in trapped inflation" Journal of High Energy Physics, 02, 008 (2017).

