

New physics in light of the primordial remnants from the early universe

The project is devoted to searching for the new physics from the very early universe dated all the way back to 13.8 billion years ago, a tiny fraction of a second after the Big Bang. Similar to fossils in the paleontology, the early universe has also granted us quite a few precious remnants which may give us some clues to the new physics. The following three pieces of potential primordial fossils are particularly interesting to me: the stochastic gravitational waves background, the primordial black holes and the primordial magnetic field. They are the remnants of the physical processes during the very early universe, may have encoded very rich information about the new physics during this epoch.

We aim at studying the origins, evolutions, and observational effects of these three primordial remnants. It is worth to notice that these three remnants may not be completely independent to each other. It is possible that two (or maybe even three) of them have a common origin. The research along this direction may uncover the mystery of the early universe, as well as the new physics that we have been searching for decades.