

## Testing Gravity Theories: Black Hole Quasinormal Modes and their Higher Overtones

The motivation of this talk is to discuss how to probe gravity theories using the quasinormal modes (QNMs) in the ringdown phase of binary black hole mergers.

In this talk, the speaker will introduce the parametrized black hole quasinormal ringdown formalism, a robust framework for analyzing the QNMs in systems resembling GR, with a focus on higher overtones. These overtones have been shown to provide critical insights during the early ringdown phases and to exhibit heightened sensitivity to the physics near black hole horizons. The speaker's findings indicate that larger deviations from general relativity typically appear in the quasinormal frequencies of the higher overtones. These deviations in quasinormal frequencies can be characterized using model-independent parameters, and an analytical method used to understand this trend will also be discussed. This talk will highlight how the QNMs and especially their higher overtones can be a powerful tool in testing gravity theories.

**Presenter:** Ms ZHANG, Jiale (IBS CTPU-CGA)

**Session Classification:** Presentations