THE CHINESE UNIVERSITY OF HONG KONG
Department of Physics

SEMINAR

Rotating Black-hole METRICS

by

Dr. Ka Wai Adrian CHUNG (鍾嘉唯博士)
Department of Physics
University of Illinois Urbana-Champaign, USA

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Time: 3:00 - 4:00 p.m.
Place: Rm 311, Science Centre North Block, CUHK

ALL INTERESTED ARE WELCOME
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Abstract

Gravitational-wave tests of general relativity have been mostly conducted in a model-independent and phenomenological way. To fully understand the physical origin of the deviations from the waveforms predicted by general relativity, which might be detected in the future, one needs to test general relativity in a model-specific way. One major obstacle to performing model-specific tests of gravity is that we have not fully understood the waveform generated by binary black holes coalescence in modified gravity, noticeable the waveform morphology during the merger and ringdown phases. In this talk, I will talk about a novel approach, Metric pErTuRbations wIth speCtral methodS (METRICS), to calculate the gravitational metric perturbations and the quasinormal-mode frequencies of rotating black holes of any spin without decoupling the linearized field equations. I will show that the METRICS approach is accurate and precise, yielding (i) quasinormal mode frequencies that agree with the known values with a relative fractional error smaller than 10^{-5} for all dimensionless spins below up to 0.95, and (ii) metric perturbations that also agree with perturbations reconstructed using other existing methods with mismatches below 1\% for all spins below 0.9. Future applications of the METRICS approach will also be discussed.

Enquiries: 3943 6303