



東北大学 宇宙創成物理学国際共同大学院プログラム

GP-PU (Graduate Program on Physics for the Universe) Seminar セミナー

“Accelerating plasma mirrors as analog black holes to investigate the information loss paradox”

by Pisin Chen

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Time and Date : 10:00 - 12:00, Thu October 31st 2019

Venue : Room 745, Science Complex B (H-03)

Abstract:

The question of whether Hawking evaporation violates unitarity, and therefore results in the loss of information, has remained unresolved since Hawking's seminal discovery. The investigations on this information loss paradox in the past 40 years have been essentially theoretical since it is almost impossible to settle this paradox through direct astrophysical black hole observations. Here, we point out that relativistic plasma mirrors can be accelerated drastically and stopped abruptly by impinging intense laser pulses into plasma targets with a density gradient. It has been known that the physics of such a system is analogous to that of the late time evolution of black hole Hawking evaporation. A conception of such an experiment is proposed and a self-consistent set of physical parameters is presented. Critical issues, such as how the unitarity during the black hole evaporation may be preserved, can be addressed through the entanglement between the analog Hawking radiation photons and their partner modes under different mirror trajectories associated with different proposed solutions to the paradox. This talk will be pedagogical and mostly intuitive without the need of background knowledge on black hole physics. An overview of the history and the development of the black hole information loss paradox will be provided in addition to introducing our proposed experiment.

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