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Title: Energy Extraction via Magnetic Reconnection from a Rotating Black Hole

Time: 10:00-11:00, 26 February (Wednesday), Shanghai time

Host: Yosuke Mizuno

Location: N601

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Abstract:

The frequent occurrences of magnetic reconnection in the accretion flow surrounding the supermassive black hole now get more and more supports from numerical simulations and observations. In recent years, researches about magnetic reconnection occurring within the ergo region of black hole attracts more attention, as it provides a new avenue to extract energy from the central black hole, which is more realizable than the classic Penrose process in astrophysical scenario. Koide and Arai checked the feasibility of energy extraction via magnetic reconnection for the first time, followed by Comisso and Asenjo, whose work in 2021 is now widely referred to be the Comisso-Asenjo process. The main content of this talk is about our recent progress on this topic. To begin with, I will introduce the background about magnetic reconnection, Penrose process and why the magnetic reconnection is believed to occur frequently near the equatorial plane of a rotating black hole. Then, the basic calculations to quantify this process will be briefly shown. The main results of our works, especially the influences of streamline of bulk plasma and orientation angle, will be exhibited. Finally, I will try to make an outlook about this topic.

Biography:

Ye Shen (沈冶) is a PhD student in the Institute of Theoretical Physics, Peking University, under the supervision of professor Bin Chen. He got his bachelor's degree from Central South University (Changsha, PRC), followed by a master's degree in Northwestern University (Evanston, USA), under the guidance of Professor Alexander Tchekhovskoy. The researches of Ye Shen mainly focus on the accretion system near supermassive black holes. While the group of professor Bin Chen is interested in the researches about black hole shadow in recent years.