

Measuring the spacetime of SMBH with pulsar timing

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Future observations with next-generation radio telescopes are expected to discover radio pulsars closely orbiting around Sagittarius A (Sgr A), the supermassive black hole (SMBH) at our Galactic Center (GC). Such a system can provide a unique laboratory for measuring the spacetime of SMBH and testing gravity theories. We provide a numerical timing model for the pulsar-SMBH systems based on the post-Newtonian (PN) equation of motion and use it to explore the prospects of measuring the BH properties with pulsar timing. We forecast the measurement precision of BH spin and quadrupole moment and thus the test of the No-hair theorem in GR. We further investigate the possibility of probing the vector charge of Sgr A* in the bumblebee gravity model.

Author: HU, Zexin

Presenter: HU, Zexin