Contribution ID: **303** Type: **Poster**

Black Hole shadow from Loop Quantum Black Hole

Tuesday, December 12, 2023 5:28 PM (1 minute)

In this study, we delve into the observational implications of rotating Loop Quantum Black Holes (LQBHs) within an astrophysical framework. We employ semi-analytical General Relativistic Radiative Transfer (GRRT) computations to study the emission from the accretion flow around LQBHs. Our findings indicate that the intensification of Loop Quantum Gravity (LQG) effects results in an enlargement of the rings from LQBHs, thereby causing a more circular polarization pattern in the shadow images. We make comparisons with the Event Horizon Telescope (EHT) observations of Sgr A* and M 87*, which enable us to determine an upper limit for the polymetric function P in LQG. The upper limit for Sgr A* is 0.2, while for M 87* it is 0.1. Both black holes exhibit a preference for a relatively high spin (a ⊠ 0.5 for Sgr A* and 0.5 ⊠ a ⊠ 0.7 for M 87*). The constraints for Sgr A* are based on black hole spin and ring diameter, whereas for M 87*, the constraints are further tightened by the polarimetric pattern.
In essence, our simulations provide observational constraints to the effect of LQG in SMBH, providing the most self-consistent comparison with observation.

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Session Classification: Accretion Processes