Contribution ID: **27** Type: **Invited Talk**

Solar Flares From Black Holes: Electromagnetic Signals From Merging Supermassive Black Holes

Friday 6 June 2025 15:00 (30 minutes)

When two galaxies collide, the supermassive black holes located at their centers can form a binary pair. These extreme gravitational situation causes ripples in spacetime (called gravitational waves) that carry away significant energy and angular momentum so that the two black holes themselves eventually collide. During the in-spiral phase, the gravitational waves are measurable by current and future space-based detectors. At the same time, the abundance of gas provided by the surrounding galaxies can heat up to extreme temperatures and simultaneously emit detectable electromagnetic radiation. Combining these observations will allow us to study the strong-field limit of general relativity in an unprecedented manner and also provide key insights into how galaxies grow and evolve over time. General relativistic fluid dynamic simulations allow us to more precisely predict how these systems would appear. In this talk I will summarize some recent simulations that reveal solar-flare-like emission that would provide a unique signature of otherwise hidden binary pairs in galaxy center.

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Session Classification: Relativity, Gravitation and Cosmology