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## **3D Dynamics of Embedded Stellar-Mass Binary Black Holes within AGN Disks and their Feedback Effects**

*Thursday, December 14, 2023 2:20 PM (20 minutes)*

The GW190521 event –an 85 Msun and a 66 Msun black hole (BH) coalescing to a 142 Msun BH –the heaviest binary black hole (BBH) merger to date has opened up new discussions on the formation channels of BBHs as possible LIGO sources. In this talk, we focus on the scenario where BBHs are embedded inside an AGN disk (disk around a supermassive black hole at the center of a galaxy). We will present high-resolution 3D simulations of stellar mass black hole binaries to examine the physical processes that regulate their orbital evolution. We demonstrate that there is a hierarchy of disk structures in such an embedded BBH, which is important in regulating the angular momentum evolution. Furthermore, we investigate how the jets from BHs could impact their surrounding environment, modifying their accretion flow and accretion rates. Implications for possible observational signatures will be discussed as well.

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**Session Classification:** GW Astrophysics