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The Joint Role of LISA and the Electromagnetic Sector

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LISA will pin down the merger rate of massive black hole binaries (MBHBs) with mass less than 10 million solar masses. But what happens in the life of a MBHB before it enters the LISA band? Wrapped up in this question is uncertain gas physics and many-body gravitational dynamics acting at the centers of galactic nuclei where MBHBs form and merge. This intriguing part of MBHB evolution, at the sub-parsec separation scale, can be directly probed via EM signatures of MBHBs. I will discuss a few promising EM signatures and techniques for identifying MBHBs at sub-parsec orbital separations. EM identification could provide predictions for the LISA merger rate before LISA flies. But, importantly, even after LISA flies, EM identification would serve as a pillar of a new field of MBHB demography, complimentary to GW detection, allowing us to maximize our understanding of MBHBs and their astrophysical environments.

Orateur: D'ORAZIO, Daniel (Harvard University)

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