

The LISA mission is due to start in the mid-2030s and will be observing low-frequency gravitational waves (GW). At the same time, the ATHENA mission will be monitoring X-ray sources at an unprecedented depth. In that observational context, supermassive black hole (SMBBH) mergers constitute an important potential source of multi-messenger observations as they are one of the most promising targets for LISA and could also be detectable in the electromagnetic (EM) regime by ATHENA. Such joint detections could lead to potential breakthroughs in several domains, from fundamental physics to accretion/ejection mechanisms. In particular, LISA allows to localise SMBH mergers several weeks before the merger.

In this contribution, we will present a simulated population of GWs observed by LISA before the merger and the associated localisation uncertainties. Based on those simulations, we used several electromagnetic emissions models to simulate realistic follow-up campaigns with two instruments: LSST and ATHENA. The former helps with tracking the time evolution of the circumbinary disk of SMBH approaching the merger. The latter provides insights into the evolution of the mini-disks located around each of the two component masses of the binary.