Detectability and identification of supermassive binary black holes with Athena

One of the key targets of the future spatial interferometer LISA are the gravitational waves emitted during the merger of supermassive black holes. The surrounding of these supermassive binary black holes, potentially gas-rich, could be powerful X-ray sources detected by the upcoming X-ray observatory NewAthena. To prepare for these joint observations of gravitational waves and electromagnetic counterparts in the LISA range, we are interested in the specific spectral signatures of these massive binaries (10^4 to 10^7 Msun) which can be used to distinguish them from single black holes in active galactic nuclei. In this work I focus on their detectability and identification through the spectral signature of the circumbinary disc + mini-discs configuration based on analytical models depending on the binary mass, mass ratio, separation and spins. I analyse these models with the X-Ray spectral fitting package Xspec and the Athena/WFI instrumental response matrices to produce simulated observations and spectral fitting statistics.

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