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Unmasking noise transients mimicking intermediate-mass black hole binaries

Intermediate-mass black holes (IMBHs) are considered to be seeds of supermassive black holes (SMBHs). Knowledge of the formation and the growth of IMBHs can lead to a better understanding of SMBH formation and galaxy evolution. In recent years, gravitational waves (GWs) have opened a new window to observe and study IMBHs. The advanced ground-based GW detectors, such as Advanced LIGO and Advanced Virgo, are sensitive to the lightest IMBH binaries (˜100 to 800 solar masses). The first confident and highly significant IMBH binary event - GW190521 was observed in the third observation run of Advanced LIGO and Virgo detectors making the future of IMBH binary detection promising. However, there are several challenges in detecting and characterising them. One of them is the presence of noisy artefacts aka "glitches"in the detector data that mimic the morphology of IMBH binaries, leading to either increase in false alarms or misclassification of glitches having direct implication on IMBH population studies. In this talk, I will introduce a Jensen Shannon divergence based similarity metric that quantifies the consistency of astrophysical parameters across the detector network and helps to distinguish IMBH binaries from loud glitches that mimic IMBH binaries. I will demonstrate the method with events from the gravitational wave transient catalogues (GWTCs).

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