

Abstract Submitted
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Distinguishing Compact White-dwarf Binary Systems - An application of GW color magnitude diagram for LISA RAVI KUMAR KOPPARAPU, Pennsylvania State University — The population of Double white dwarf (DWD) and neutron star-white dwarf (NSWD) binaries in our Galaxy are considered to be some of the most promising gravitational-wave (GW) sources for LISA. Electromagnetic observations have already discovered several of these white-dwarf binary systems in various phases of their evolution, in LISA's band of detection. Here we illustrate a GW equivalent of a color-magnitude diagram (CMD), assuming non-zero temperature white-dwarf donors, and propose boundaries for both inspiralling and mass-transferring systems in the CMD. Depending upon the precision with which LISA can measure the frequency evolution (\dot{f}) of a white-dwarf binary system we show that one can distinguish between a DWD and a NSWD system, and possibly the composition of the donor white dwarf, using CMD. We assess the limits and applicability of our theoretical boundaries with respect to observations and find that a measurement of \dot{f} by LISA at high frequencies ($\log[f] \geq 2$) would likely distinguish between DWD/NSWD binary. For low-frequency sources, GW observations alone would unlikely tell us about the binary components, without the help of electromagnetic observations.

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