



Laboratoire LEPRINCE-RINGUET
Ecole polytechnique IN2P3/CNRS

Séminaire

Searching for the progenitors of the low-mass binary black-hole mergers

I describe in this talk the formation history and progenitor properties of the low-mass binary black hole mergers, detected during the LIGO-Virgo observing runs, in the context of the isolated binary stellar evolution scenario. Their binary evolution is reproduced using the 1D-hydrodynamic stellar-evolution code MESA, adapted to include both the black hole formation and the unstable mass transfer during the crucial common-envelope phase. By taking into account the initial stellar binary distribution, and exploring a wide parameter space for intrinsic parameters, such as initial stellar mass, orbital separation, metallicity, and mass-transfer efficiency, we obtain the distribution for chirp mass, mass ratio, and merger time delay. We then predict the expected merger rates, in agreement with the LIGO-Virgo detections. The common-envelope phase plays a fundamental role in the binary evolution leading to low-mass binary black holes, since only the progenitors successfully going through this unstable mass-transfer phase are able to merge in less than a Hubble time. I finally discuss the implications of these low-mass binary black hole mergers, within the isolated binary stellar evolution scenario.

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Salle de conférence
et Zoom

Lundi 28 Mars
14h00

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