

THE STRING THEORY UNIVERSE - 22nd European string workshop and Final COST MP1210 Conference



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General interest talk - Alessandro Nagar

Tuesday 21 February 2017 14:15 (50 minutes)

Title: “Gravitational waves from coalescing compact binaries: interfacing analytical and numerical approaches”

“The direct detection by the LIGO detectors of the gravitational waves emitted by a coalescing black hole binaries (GW150914 and GW151226) has marked the beginning of gravitational wave (GW) astronomy. In the first part of the talk, I will review the recent experimental result and remind the basic elements of gravitational wave theory, focusing on the qualitative structure of the GW signal emitted by a coalescing binary (either made by two black holes or two neutron stars). In the second part of the talk, I will introduce the state-of-the-art analytical effective-one-body (EOB) approach to the general-relativistic two-body dynamics, its completion using numerical relativity (NR) simulations of (spinning) coalescing black hole binaries and its necessity to compute the (thousands of) analytical waveform templates needed for the actual data analysis of GW events like GW150914 and GW151226. Such theoretical interplay between analytical methods and numerical simulations is the key ingredient behind our interpretation of these events as a binary black hole coalescences.”