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Parallel session: Gravitational Wave Data Analysis

Title: Catching the wildest waves: detection template families for the late inspiral  
of spinning black-hole binaries

Abstract: I discuss the recent work on formulating families of effective templates for the detection of gravitational waves from black-hole--black-hole and neutron-star--black-hole binaries using first-generation interferometric detectors. The proposed template families span (and extend) the range of waveforms predicted by a variety of post--Newtonian resummation techniques, in the late-inspiral frequency band where the post--Newtonian expansion cannot be trusted fully; they also include the dramatic waveform modulations induced (mainly) by precession of the orbital plane caused by spin couplings. The families are effective in that they are not obtained from a specific set of equations of motion and physical parameters; rather, they model phenomenologically the structure of the waveforms. They approximate closely (with high fitting factors) the waveforms computed using the various resummation techniques; furthermore, the false-alarm statistics of the templates are encouraging, the size of the template banks is manageable, and implementation seems straightforward. [In collaboration with Alessandra Buonanno and Yanbei Chen.]