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Modeling the dynamics of tidally-interacting binary neutron stars up to merger SEBASTIANO BERNUZZI, Caltech — In this talk, I will report about recent developments in the numerical and analytical modeling of neutron star mergers dynamics and gravitational radiation. I will discuss a new effective-one-body model that incorporates an enhanced attractive tidal potential motivated by recent analytical advances in the post-Newtonian and gravitational self-force description of relativistic tidal interactions. No fitting parameters are introduced for the description of tidal interaction in the late, strong-field dynamics. The model describes dynamics and waveforms from early inspiral up to merger, captures the tidal amplification effects close to merger, and essentialy agrees with numerical data within their uncertainty. Further, I will discuss quasiuniversal relations that characterize the merger dynamics. The equation of state (and mass ratio) dependency of several binary quantities is fully captured by certain dimensionless tidal coupling constants that parametrize the binary tidal interactions. The quasiuniversality is a property of the conservative dynamics; nontrivial relations emerge as the binary becomes tidally dominated. Some recent results about spinning neutron star mergers in the constant rotational velocity numerical relativity framework will be also mentioned.

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