

Tuesday, October 13th @ 2pm

Schwinger Lounge

Hosted by Prof. Thomas Dumitrescu

“The structure of the relativistic two-body problem”

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Abstract: The relativistic two-body problem lies at the heart of gravitational-wave physics, while also providing a rich theoretical laboratory for nonlinear dynamics and strong-field gravity. In this talk I will discuss structural relations that connect seemingly different descriptions of binary dynamics. These include the exchange symmetry of the two bodies and its role in organizing self-force expansions, the use of gauge-invariant observables and action variables, and the first-law framework for bound and scattering systems. I will also discuss the boundary-to-bound dictionary, which relates scattering data to bound-state dynamics through analytic continuation, and the mapping of these invariant results into the effective-one-body framework. Together, these structures reveal unexpected connections between post-Newtonian, post-Minkowskian, self-force, and numerical-relativity descriptions of the relativistic two-body problem.