

# **Simulations of Interacting Binary Stars Using Octo-tiger with HPX**

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**ABSTRACT:** Octo-tiger is a computer code for modeling the three-dimensional dynamical evolution of self-gravitating fluids. It is designed with features that enable machine precision conservation of both angular and linear momenta, as well as energy, making it particularly suited for modeling interacting binary systems from the moment of Roche lobe overflow through merger. Octo-tiger is capable of generating initial conditions for detached, semi-detached, and contact binaries. It is parallelized with the High Performance Parallax (HPX) library, a C++ runtime system enabling fine grained parallelism across distributed computing systems. Here we present an overview of Octo-tiger and HPX, and results from a few binary star simulations. This includes a model of the luminous red nova, V1309 Scorpii, as well as a model of double white dwarf mass transfer over 100+ orbital periods.