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Tidal disruption process for a Newtonian star and non-spinning black hole ROSEANNE CHENG, TAMARA BOGDANOVIC, Center for Relativistic Astrophysics, Georgia Institute of Technology — In this study, we analyze the tidal process which disrupts a Newtonian star on a parabolic orbit about a non-spinning black hole and places the debris on bound and unbound trajectories. We implement a three dimensional hydrodynamics and self-gravity code which also calculates the relativistic tidal interaction in a local moving frame centered on a star. We characterize the mass tidally stripped from the star and estimate the orbital parameters of the debris by local to black hole frame transformations. We discuss the bound and unbound "kicks" to the star off of its initial orbit in weak and partially disruptive encounters. We show super-Eddington return rates of debris which closely follow the canonical $t^{-5/3}$ fall-off. We also show results of encounters very close to the black hole ($\lesssim 10M$) and discuss the relativistic effects early in the return rate.

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