

BLACK HOLES IN DENSE STAR CLUSTERS
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TITLE: Production of the Fastest Luminous Stars in the Universe

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The discovery of hypervelocity stars (HVS) leaving our galaxy with speeds of nearly 1,000 km/s has provided strong evidence that the central black hole frequently disrupts binary stars. In my talk I will show that this mechanism can be extended to massive black hole (MBH) mergers, where the secondary star is replaced by a MBH with mass greater than 10^5 solar masses. We find that stars that are originally bound to the secondary MBH are frequently ejected with $v > 10,000$ km/s, and occasionally with velocities up to one third the speed of light, for this reason we refer to stars ejected from these systems as "semi-relativistic" hypervelocity stars (SHS). Bound to no galaxy, the velocities of these stars are so great that they can cross a significant fraction of the observable universe in the time since their ejection. A few thousand of these objects likely reside within 1 Mpc of the Milky Way at the present day, with tens of objects being giant stars that would be detectable by future all-sky infrared surveys.