

**BLACK HOLES IN DENSE STAR CLUSTERS**  
**Aspen Center for Physics**  
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TITLE: The Ongoing Hunt for SMBH Binaries

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Supermassive black hole binaries (SBHBs) are thought to be a natural, if not inevitable, phase in scenarios where most massive galaxies host central black holes and undergo frequent mergers as they evolve. While there are convincing examples of kiloparsec-separation pairs, there is no robust evidence for the sub-parsec binaries that are expected to exist. The detection of this population would contribute important evidence in favor of the prevailing galaxy evolution scenarios, and is also of interest in other fields including gravitational wave astronomy. We have undertaken a systematic search for close SBHBs based on the hypothesis that the secondary black hole in the binary accretes at a much higher rate than the primary, and its emission lines are doppler shifted due to its orbital motion (analogous to a single-line spectroscopic binary). Our sample of 88 candidates is therefore selected from  $z < 0.7$  SDSS quasars via substantial ( $> 1000$  km/s) shifts of their broad H-beta lines relative to their systemic redshifts. I will present an update on our efforts to evaluate the credentials of the candidates, including new radial velocity measurements from the spectroscopic monitoring program, a comparison of the spectral variability of the binary candidates to the broader quasar population, and a search for signs of recent merger activity in the host galaxies of the binary candidates.