

BLACK HOLES IN DENSE STAR CLUSTERS
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TITLE: Quiescent LMXBs in Globulars and the Bulge: BHs vs. NSs vs. mCVs?

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High resolution Chandra observations have shown that globular clusters have significant populations of neutron stars in compact binaries that are detected as “quiescent” LMXBs with luminosities typically $L_x \sim 10^{32}$ erg/s, which in some cases are observed to undergo accretion disk instability outbursts to reach $L_x \sim 10^{36}$ with ~ 5 - 10 y recurrence times. An even larger number of persistently accreting white dwarfs are observed with comparable L_x and hard spectra and are most likely magnetic CVs (mCVs), although some could be “transitional” millisecond pulsars (tMSPs) that “feed” the larger graveyard population of MSPs. Evidence for any BH-LMXBs in Milky Way globular clusters has been lacking until the recent discoveries of 4 candidates (in 3 globulars), all identified by their radio vs. X-ray luminosities. This is in stark contrast to field LMXBs, where the BH-LMXBs, all transients, appear to outnumber (significantly) the NS-LMXBs based on our DASCH studies of duty cycles for each population. I will outline a dynamical model for formation of BH-LMXBs in young clusters that may explain the field and Bulge populations and then explore what must be different for globulars. I will also briefly examine the possible alternative explanation(s) for the 4 BHCs in Galactic globulars.