Abstract Submitted
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A Deep Chandra X-Ray Limit on the Putative IMBH in Omega Centauri[1] DARYL HAGGARD, Northwestern University/CIERA, ADRIENNE COOL, San Francisco State University, CRAIG HEINKE, University of Alberta, ROELAND VANDERMAREL, Space Telescope Science Institute, HALDANN. COHN, PHYLLIS LUGGER, Indiana University, JAY ANDERSON, Space Telescope Science Institute — We report a sensitive X-ray search for the proposed intermediate-mass black hole (IMBH) in the Galactic cluster, ω Centauri. Combining Chandra X-ray data from Cycles 1 and 13, we obtain a deep ($\sim$291 ks) exposure of the central regions of the cluster. We find no evidence for an X-ray point source near any of the cluster's proposed dynamical centers, and place an upper limit on the X-ray flux from a central source of f_X(0.5-7.0 keV) $\leq 5.0 \times 10^{-16}$ erg cm^{-2} s^{-1}. This corresponds to an unabsorbed X-ray luminosity of L_X(0.5-7.0 keV) $\leq 1.6 \times 10^{30}$ erg s^{-1}, for a cluster distance of 5.2 kpc, Galactic column density $N_H = 1.2 \times 10^{21}$ cm^{-2}, and power-law spectrum with $\Gamma = 2.3$. If a $\sim 10^4$ M_{sum} IMBH resides in the cluster's core, as suggested by some stellar dynamical studies, its Eddington luminosity would be $L_{Edd} \sim 10^{42}$ erg s^{-1}. The new X-ray limit would then suggest an Eddington ratio $\sim$10 lower than even the quiescent state of our Galaxy's notoriously inefficient supermassive black hole Sgr A*. This study leaves open three possibilities: either ω Cen does not harbor an IMBH or, if an IMBH does exist, it must experience very little or very inefficient accretion.

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Daryl Haggard
Northwestern University/CIERA

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