

BLACK HOLES IN DENSE STAR CLUSTERS
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TITLE: Detection of Galactic Center Source G2 at 3.8 microns during Periapse Passage

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We report new observations of Galactic Center sources G2 and Sgr A* from the W. M. Keck Observatory. Both sources are of great interest and vary temporally; G2 is the putative gas cloud now passing through periape in its orbit around the black hole at the center of the Milky Way Galaxy and Sgr A* is the emission associated with the central black hole. Our observations were obtained on 2014 March 19 & 20 (UT) with the Keck II laser guide star adaptive optics system (LGSAO) and the facility near-infrared camera (NIRC2) through the K' and L' broadband filters. At this time, G2 was expected to have been at closest approach with a separation from Sgr A* of only ~ 20 mas and, therefore, to be spatially unresolved from Sgr A*. Nevertheless, the two can be disentangled spectrally. In the L'-band, both Sgr A* and G2 contribute to the total flux; however, Sgr A*'s L' flux is estimated and removed based on (1) the analysis of K'-band maps showing bright and low states of Sgr A* (2) the well measured and constant K'-L' color of Sgr A*. We conclude that G2, which is currently experiencing its closest approach, is still intact and compact, in contrast to predictions for a simple gas cloud hypothesis and therefore most likely hosts a central star.