

BLACK HOLES IN DENSE STAR CLUSTERS
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POSTER TITLE: The Peculiar Pulsar Population of the Central Parsec

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Pulsars orbiting the Galactic center black hole, Sgr A*, would be potential probes of its mass, distance, and spin, and may even be used to test general relativity. Despite predictions of large populations of both ordinary and millisecond pulsars in the Galactic center, none have been detected within 25 pc by deep radio surveys. One explanation has been that hyperstrong temporal scattering prevents pulsar detections, but the recent discovery of radio pulsations from a highly magnetized neutron star (magnetar) within 0.1 pc shows that the temporal scattering is much weaker than predicted. We argue that an intrinsic deficit in the ordinary pulsar population is the most likely reason for the lack of detections to date: a "missing pulsar problem" in the Galactic center. In contrast, we show that the discovery of a single magnetar implies efficient magnetar formation in the region. If the massive stars in the central parsec form magnetars rather than ordinary pulsars, their short lifetimes could explain the missing pulsars. Efficient magnetar formation could be caused by strongly magnetized progenitors, or could be further evidence of a top-heavy initial mass function. Furthermore, current high-frequency surveys should already be able to detect bright millisecond pulsars, given the measured degree of temporal scattering.