

A search for pulsars in the central parsecs of the Galactic center

Andrew Siemion¹, Matthew Bailes², Geoff Bower¹,
Jayanth Chennamangalam³, Jim Cordes⁴, Paul Demorest⁵,
Julia Deneva⁶, Gregory Desvignes⁷, John Ford⁵, Dale Frail⁵,
Glenn Jones⁸, Michael Kramer⁷, Joseph Lazio⁹, Duncan Lorimer³,
Maura McLaughlin³, Scott Ransom⁵, Anish Rosh⁵, Mark Wagner¹,
Dan Werthimer¹ and Robert Wharton⁴

¹University of California, Berkeley
email: siemion@berkeley.edu

²Swinburne University

³West Virginia University

⁴Cornell University

⁵National Radio Astronomy Observatory

⁶Arecibo Observatory

⁷Max Planck Institute for Radio Astronomy

⁸California Institute of Technology

⁹Jet Propulsion Laboratory

Abstract. The discovery of a pulsar or pulsars orbiting near the Galactic Center (GC) could offer an unprecedented probe of strong-field gravity, the properties of our galaxy's supermassive black hole and insights into the paradoxical star formation history of the region. However, searching for pulsars near the GC is severely hampered by the large electron densities along our line of sight and the scattering-induced pulse broadening of the pulsar emission observed through it. As the broadened pulse length approaches the pulsar period, the periodicity in pulsar emission becomes nearly undetectable. Searches extended to higher frequencies, in an effort to reduce scattering, suffer from reduced intrinsic flux, higher system temperatures and increased atmospheric opacity. We are currently attempting to mitigate the challenges associated with searching for pulsars near the GC by employing new wide bandwidth receivers, upgraded IF distribution systems and novel digital spectrometers in a GC pulsar search campaign at the Green Bank Telescope in West Virginia, USA.

Our search will cover two frequency bands, from 12-15 GHz (Ku Band) and 18-26 GHz (K Band), during a total of approximately 30 hours of observations, with expected characteristic 10-sigma sensitivities between 5-10 micro-Jy. Our first observations are scheduled for mid-March 2012. Here we will present the status of our observations and initial results.