**ngVLA Key Science Goal 4: Fundamental Physics with Galactic Center Pulsars**

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- General relativity and black hole physics with a pulsar orbiting Sgr A*
- Star formation, stellar death, dynamics, dark matter within the Central Molecular Zone
- Interstellar medium, turbulence, magnetic fields within the Central Molecular Zone

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**Discovery of the GC Magnetar**

- Serendipitous X-ray discovery in 2013 (Degenaar et al 2013)
- Radio pulsations P=3.7s (Eatough et al 2013)
- 2.4" = 0.1 pc in projection from Sgr A*
- Orbital period > 700 yr (Bower et al 2015)
- Not suitable for GR but proof of concept for bound pulsar detection

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**Unique ngVLA Capabilities for GC Pulsars**

- High sensitivity at frequencies ~ 3 – 30 GHz
- Flexible wide-band DSP
- Maximum BW per Rx (~8 GHz)
- Sub-millisecond imaging
- Beam-forming capability
- Central core suitable for phasing
- VLBI for astrometry

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**Scattering limits low frequency pulsar detection**

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**Measurement precision is optimized at frequencies between 5 GHz and 30 GHz, frequencies at which the ngVLA is being optimized:**

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**Detectability of the known pulsar population:**

See Bower et al. (2018), “Galactic Center Pulsars with the ngVLA” in the *Science with a Next-Generation VLA* book for more details.
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Authors