The supernova remnant (SNR) G21.5-0.9 has been observed regularly with the Chandra X-ray observatory since its launch in 1999, and has become a textbook example for a young plerionic SNR. The remnant hosts a bright pulsar wind nebula (PWN), powered by a 61.8 ms pulsar (PSR J1833-1034, $B = 3.6 \times 10^{-12}$ G, and spin down luminosity $Edot=3.3 \times 10^{37}$ erg/s), and a faint limb-brightened shell revealed in X-rays with Chandra. The nature of the X-ray emission from the shell (thermal versus non-thermal) and knots within the nebula (ejecta?) remains a puzzle.

To address this, we present a follow-up X-ray analysis of G21.5-0.9 (study in progress) utilizing the deepest (> 1 Msec total) exposure to date, including ~780 ks with the Advanced CCD Imaging Spectrometer (ACIS) and ~310 ks with the High Resolution Camera (HRC). These observations spanning ~15 years also allow for the study of variability and tracking the motion of small scale structures within the PWN.

**Eastern Limb**

**Non-Thermal?**

- Observations: 37
- $E(\gamma) = 3.3 \times 10^{37}$ erg/s
- $\gamma = 0.12 - 0.20$
- $kT = 0.08 - 0.72$
- $E_{\gamma} = 0.18 - 0.56$
- $\chi^2 = 1.308 (1421)$

The shell emission is primarily non-thermal. The addition of a thermal component (few % of non-thermal) improves the fit and is required with an F-Test probability of 6.0E-8.

**Northern Knot**

**Ejecta?**

- Observations: 70
- $E(\gamma) = 3.3 \times 10^{37}$ erg/s
- $\gamma = 0.12 - 0.20$
- $kT = 0.08 - 0.72$
- $E_{\gamma} = 0.18 - 0.56$
- $\chi^2 = 1.308 (1421)$

The knot emission is dominated by non-thermal or hard emission, with a shocked plasma thermal component characterised by an enhanced abundance of Silicon and a large ionization timescale.

The overabundance of Silicon suggests that the knot consists of ejecta rather than mass swept-up from the ISM.

A pure thermal model yields a temperature of 5.7 keV, much too high to be physical and points to the need for the two-component model.

**Variability Observations with ACIS**

- Exposure corrected ACIS images of the PWN. Each image is smoothed to 1” and normalized to 20ks. The colour bar has units of counts/pixel.

**Variability in the Pulsar Wind Nebula**

Example difference image created by subtracting the May 6 2014 observation from the May 30 2011 HRC observation shown in the image on the left. The region close to the pulsar was omitted to highlight the PWN variability.

**References**