

# RADIO POLARIMETRIC STUDY OF THE GALACTIC CENTER THREADS

CORNELIA C. LANG AND MARK MORRIS  
*UCLA Department of Physics and Astronomy  
Los Angeles, CA 90095*

**Abstract.** The Very Large Array (VLA) has been used to carry out a high resolution, polarimetric study of the isolated non-thermal radio filaments, G0.08+0.15, and G359.96+0.09, also known as the Northern and Southern Threads, found near the Galactic Center (GC).

## 1. Observations

These sources have been observed with the VLA at 6 cm (4585 and 4885 MHz) and 3.6 cm (8465 and 8085 MHz), using data combined from the DnC and BnA hybrid arrays.

## 2. Results

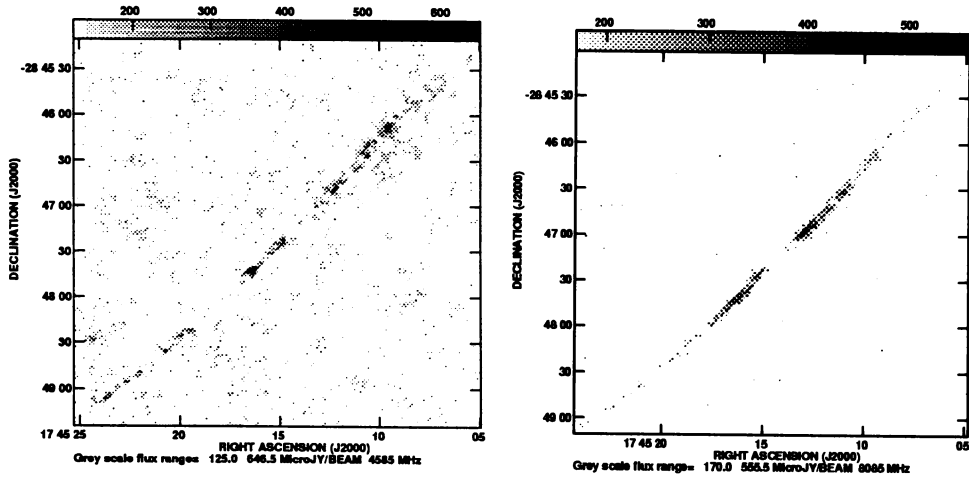
### 2.1. NORTHERN THREAD

#### 2.1.1. *Total Intensity*

The 6 cm total intensity map of the Northern Thread is shown in Figure 1, and for the first time, the filament is resolved. The width of the Northern Thread is observed to vary between 4" and 12" (0.2-0.5 pc) along its length. The image reveals little substructure along the filament compared to what has been observed in other GC filament systems (Gray et. al, 1995, ApJ, 448, 164; Yusef-Zadeh et al. 1997, ApJ, 475, 119).

#### 2.1.2. *Polarized Intensity*

The polarized intensity arising from the Northern Thread at 3.6 and at 6 cm is shown in Figure 2. At both frequencies, the polarized intensity



*Figure 1.* Left panel: Total intensity at 6 cm centered on the Northern Thread with resolution of  $2.^{\circ}12 \times 1.^{\circ}73$ . The Thread intersects the thermal Arched Filaments at its Easternmost extent. Right panel: Greyscale represents distribution of polarized intensity at 3.6 cm, in units of  $\mu\text{Jy}/\text{beam}$  at a resolution of  $2.^{\circ}00 \times 2.^{\circ}49$ .

has a patchy distribution, and the enhanced depolarization seen at 6 cm compared to that at 3.6 cm is likely due to Faraday depolarization.

### 2.1.3. Rotation Measure and Intrinsic Magnetic Field Orientation

Large rotation measures of  $2500 - 3000 \text{ rad m}^{-2}$  have been observed toward portions of the Northern Thread, but the RM varies irregularly across the filament, and typical values are in the range  $100 - 2000 \text{ rad m}^{-2}$ . The lack of apparent patterns in the distribution of RM suggests that the Faraday rotating medium is not intimately associated with the filament. After correction for Faraday Rotation, the intrinsic magnetic field direction in the Northern Thread is predominantly aligned along the long axis of the filament.

## 2.2. SOUTHERN THREAD

At both 3.6 and 6 cm, the Southern Thread did not stand out in total intensity against the halo of the strong radio source SgrA. However, at 3.6 cm, the filament is seen in polarized intensity, and it appears bifurcated, similar to what is seen in total intensity at 20 cm (Morris & Echevarria, in preparation).