The Nature of X-ray Filaments Associated with the Galactic Center Arc

F. Yusef-Zadeh(*Northwestern U.*) C. Law (*CfA*), M. Wardle (*U. of Stdney, Australia*), A. Fruscione (*CfA*)

Abstract

The Galactic center region near l$\approx 0.2^\circ$ hosts a mixture of nonthermal linear filaments and thermal radio continuum features associated with the radio Arc. Chandra observations of this region find a nonthermal X-ray filament and thermal X-ray gas with an extent of roughly $60'' \times 2''$ and $5' \times 3'$, respectively. The X-ray filament lies at the edge of the nonthermal radio filaments and a dense molecular shell G0.11-0.11 and has a power-law spectrum with a photon index $\alpha \sim 1.6 \pm 0.2$. Diffuse thermal X-ray gas with kT$\sim$10 and 1 keV has also been detected throughout the molecular shell. This cloud coincides within the error circle of a steady high energy $\geq$100 MeV source 3EGJ1746–2851 with a photon index $\alpha \sim 1.7$.

Preliminary results of these observations suggest that the expansion of the molecular shell into the radio filaments of the Arc has led to the acceleration of high energy (TeV) electrons within a shock front at the interface between nonthermal radio filaments of the Arc and the dense molecular cloud G0.11-0.11.

CATEGORY: NORMAL GALAXIES