The Collimated Jet Source in IRAS 16547-4247: Time Variation, Possible Precession, and Upper Limits to the Proper Motions Along the Jet Axis

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Abstract.

The triple radio source detected in association with the luminous infrared source IRAS 16547-4247 has previously been studied with high angular resolution and high sensitivity with the Very Large Array at 3.6 cm wavelength. In this paper, we present new 3.6 cm observations taken 2.68 years after the first epoch that allow a search for variability and proper motions, as well as the detection of additional faint sources in the region. We do not detect proper motions along the axis of the outflow in the outer lobes of this source at a 4σ upper limit of ~160 km s^{-1}. This suggests that these lobes are probably working surfaces where the jet is interacting with a denser medium. However, the brightest components of the lobes show evidence of precession, at a rate of 0.°08 yr^{-1} clockwise in the plane of the sky. It may be possible to understand the distribution of almost all the identified sources as the result of ejecta from a precessing jet. The core of the thermal jet shows significant variations in flux density and morphology. We compare this source with other jets in low- and high-mass young stars and suggest that the latter can be understood as a scaled-up version of the former.

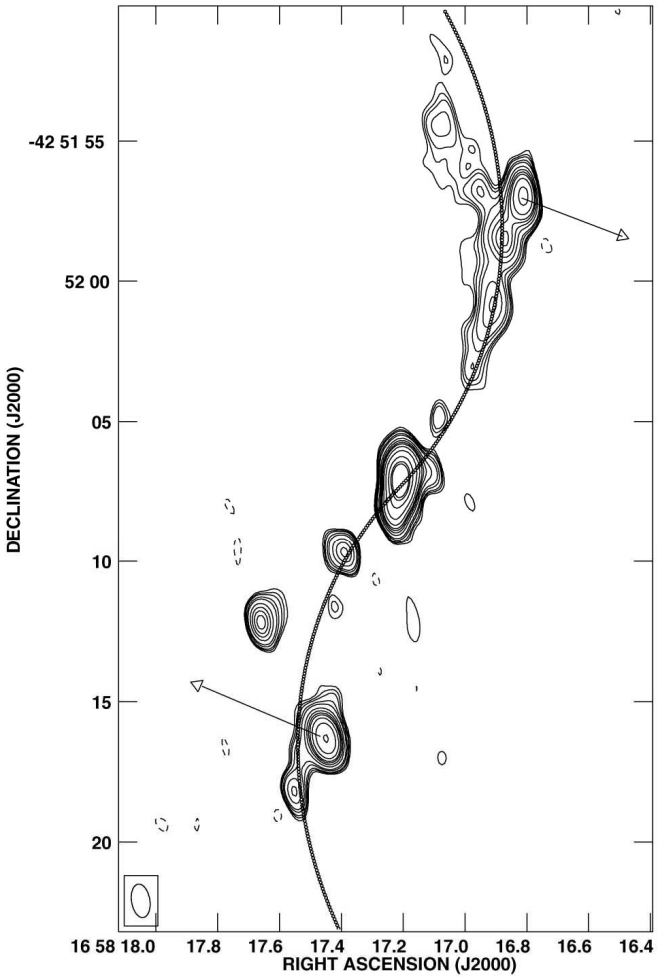

Figure 8. VLA contour image at 8.46 GHz toward IRAS 16547-4247 for epoch 2003.74. Contours and beam are as in Figure 2. The solid line indicates the position of the spiral model discussed in the text. The arrows indicate the proper motions of components N-1 and S-1 for a period of 300 years.