FAST [Fe II] WIND WITH A WIDE OPENING ANGLE FROM L1551 IRS 5

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ABSTRACT

We present new velocity-resolved spectra of the [Fe II] $\lambda$1.644 $\mu$m line emission toward the L1551 IRS 5 outflow. The spectra were taken toward the bright [Fe II] knots PHK1 and PHK2 with the slit positions perpendicular to the northern jet. We have two major conclusions: (1) At PHK1 located $1''$ away from the L1551 IRS 5 VLA sources, the spatial profile of the low radial velocity component at $V_{\text{LSR}} \sim -110$ km s$^{-1}$ shows two spatial subcomponents with their FWHMs of $0''83$ and $2''84$. The wide subcomponent has an wide opening angle of $\sim 100^\circ$, which is consistent with the opening angle suggested by the broad velocity width of the narrow one. It favors the interpretation that both subcomponents of the LVC arise from the same outflow. The gas corresponding to the wide subcomponent fills the space between the optical jet and the shell of the CO molecular outflow, and may be sweeping up envelope material in the vicinity of the protostars. (2) At PHK2 located $\sim 4''$ away from the VLA sources, we confirmed that the northern jet has two radial velocity components: $V_{\text{LSR}} \sim -270$ km s$^{-1}$ and $-140$ km s$^{-1}$. The former velocity component is highly collimated because it has the same spatial width of $0''78$ at both of the two [Fe II] knots.

Subject headings: ISM: Herbig-Haro objects — ISM: individual (HH 154, L1551) — ISM: jets and outflows — stars: formation — stars: pre-main sequence — infrared: ISM

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