A 200 km/s Molecular Wind in the Carbon Star V Hya

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The carbon star V Hya is remarkable for having a bipolar outflow resolved in observations of the CO (1–0) and (2–1) rotational lines (e.g. Kahane, Maizels & Jura 1988, *ApJ*, 328, L25). Observations of the CO (2–1) and (3–2) lines in this star using the 10.4-m telescope of the Caltech Submillimeter Observatory (Mauna Kea, Hawaii) now reveal a fast wind with an outflow velocity of about 200 $\mathrm{km\,s^{-1}}$. Several distinct kinematic components can be identified in the V Hya wind, all of them having the same central velocity as the star: (*i*) a strong central component with an outflow velocity V_e of about 45 $\mathrm{km\,s^{-1}}$, (*ii*) a bipolar flow with $V_e = 7$ $\mathrm{km\,s^{-1}}$, and (*iii*) a fast wind ($V_e = 200$ $\mathrm{km\,s^{-1}}$), possibly bipolar as well. These features are unique among C stars, though they are reminiscent of proto-planetary nebulae like CRL 618 or CRL 2688. The C star V Hya may therefore be in the first stages of its transition to a planetary nebula.

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