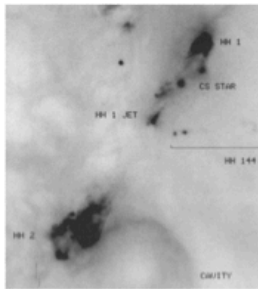


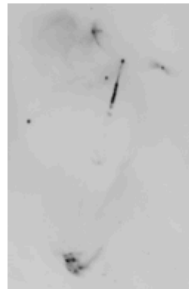
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Herbig-Haro objects are commonly visible in star forming regions and are shocks associated with outflow and jet activities powered by young stars. HH 1-2, HH 34, and HH 92 are three of the best examples of finely collimated Herbig-Haro flows. While they have been studied extensively from optical to near infrared wavelengths, little work has been done to study their sub-millimeter properties and molecular environments. Here we present new SMA observations of these three regions. High resolution interferometric observations resolve the driving sources of the Herbig-Haro complex, and reveal the small-scale circumstellar structures, including wide-angle bipolar outflow and new candidates of rotating disks around embedded protostars.

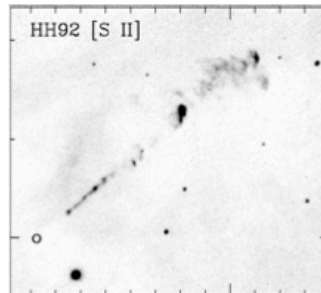
HH 1-2



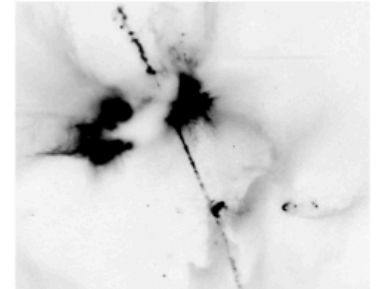
HH 34



HH 92



HH 24

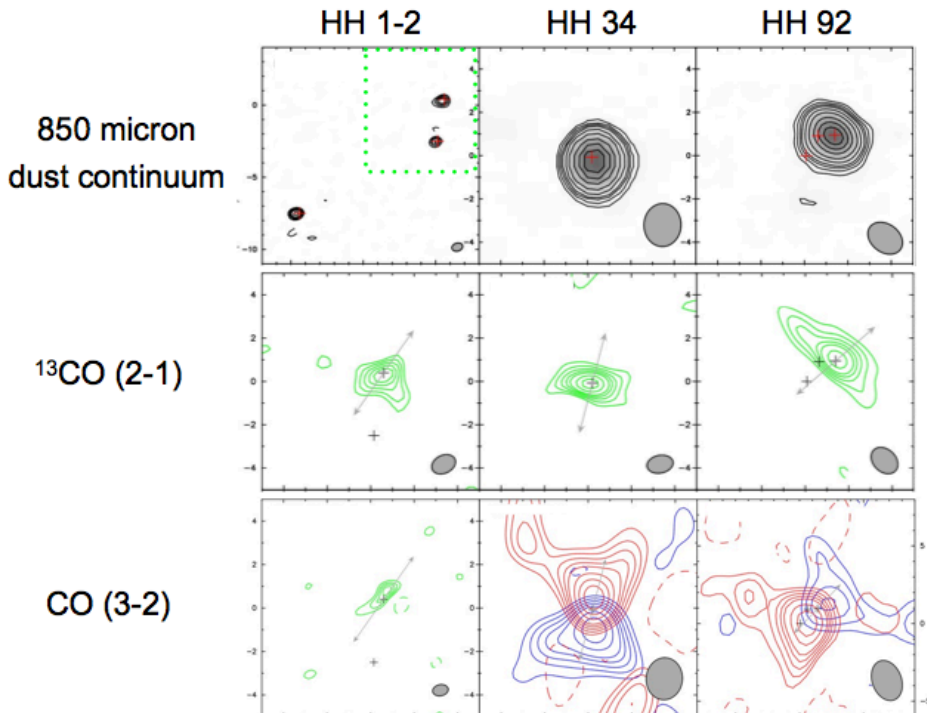


- Driven by a young multiple system, consisting of two Class 0 protostars (VLA 1 & VLA2) and a Class I binary (VLA 4)

- Driven by HH 34 IRS, a Class I protostar

- VLA observations at 3.5 cm resolve the core into 3 sources (Rodriguez et al. 2014).
- VLA 1 is a protostar in transition from Class 0 - I
- VLA 2 and VLA 3 are thermal emission from shocks and do not contain protostars

- Above is a HST WFC3 image taken in [Fe II] 1.6 micron filter.
- SMA observations are under reduction



- Located at Orion ~420 pc
- Highly collimated optical jets
- At HH 1-2, molecular emission is only detected around VLA 1
- At HH 34, a disk-like structure is detected in ^{13}CO , C^{18}O , and C^{17}O lines inside the large-scale envelope seen by single-dish telescope.
- At HH92, a filamentary inner envelope is seen in ^{13}CO line.
- Inner envelopes flattened perpendicular to the optical jet
- At HH 34 and HH 92, CO molecular outflows show cone morphology despite the highly collimated optical jets
- At HH 1-2, a weak collimated CO outflow is detected

- In the ^{13}CO line, a velocity gradient perpendicular to the jet axis is seen around HH 34 IRS.

