The binarity of pre-main sequence Herbig Ae/Be stars

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The introduction

•Herbig Ae/Be stars are pre-main sequence stars of intermediate mass (3-8 M solar)

The binary statistics provide important clues to their formation

Here we present spectro-astrometry of a sample of 28 Herbig Ae/Be stars

I Peak position, x, FWHM

The Method:

Spectro-astrometry measures the position of a 2D longslit spectrum as a function of wavelength
The centering accuracy is at the sub-pixel level and has reached 2 milli-arcsec in 2 arcsec seeing
If two sources have different spectra, the binary is readily revealed
Even if the binary is unresolved in the data

The Results

We observed 28 Herbig Ae/Be stars
Retrieved all known binaries, discovered 6 new and 5 possible binaries
Position angles accurate to witin 2 degrees
Binary fraction is 68+/11%
The highest fraction ever with a single technique
Comparison with polarization studies reveals that the binaries are aligned with their circumprimary



Spectro-astrometry of HK Ori, only discovered in 1997 to be a 0.5 arcsec binary with speckle interferometry. The binary is readily visible. The H α emitting object is in the South-West (Baines et al.



2004, MNRAS 353, 697)

The Conclusions

 Fragmentation scenario favoured over stellar capture

 Formation highest mass Herbig binaries hard to explain with capture as this predicts randomly aligned disks and binaries
 Published in *Baines et al 2006 MNRAS 367, 737*

The Future

Exploit method to derive spectra of unresolved components
Find and measure the disks (data for CO 2.3 µm in hand)