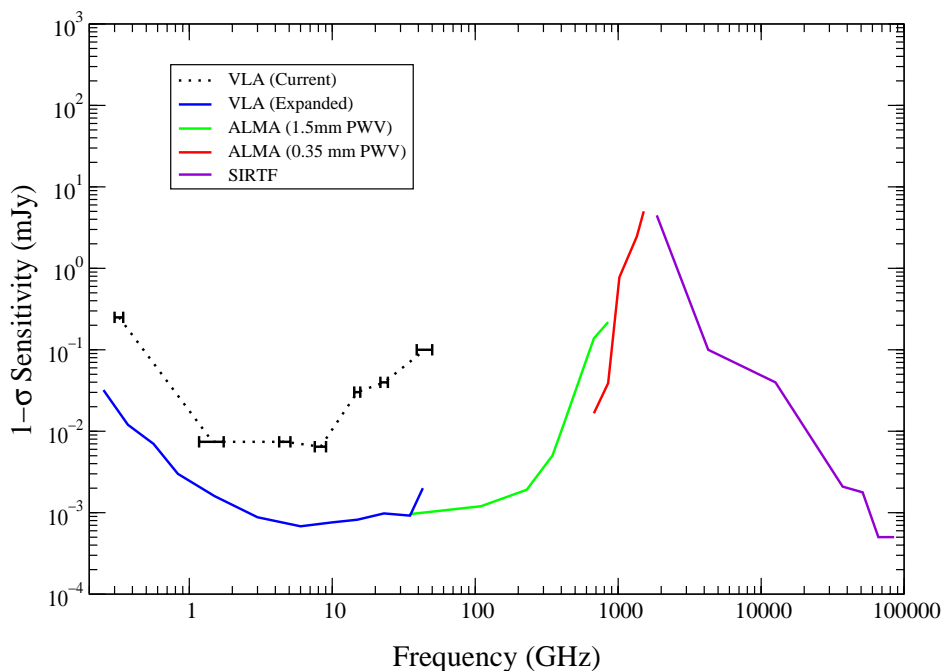


JETS AND OUTFLOWS FROM YOUNG STELLAR OBJECTS

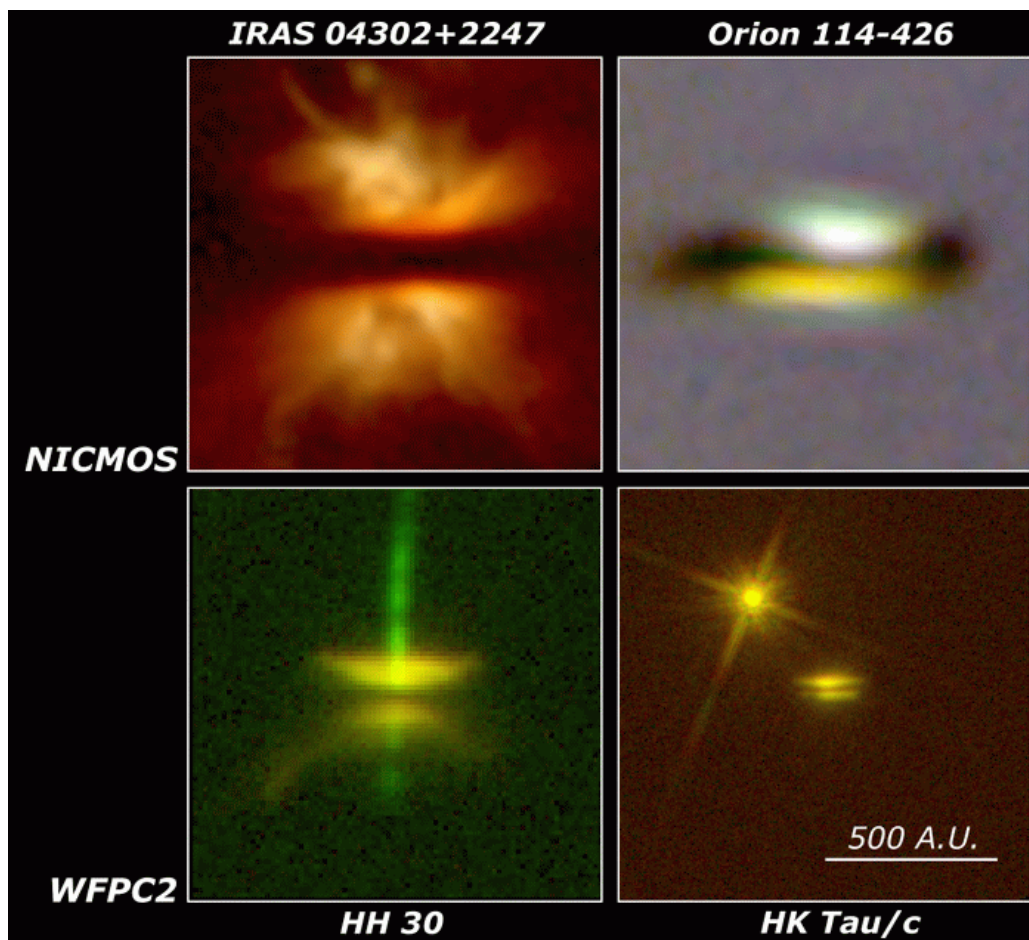
- Multiwavelength Astronomy is the Research Approach of the XXI Century
- There is Consensus in Searching for Great Sensitivity and Angular Resolution at all Wavelengths

EVLA, ALMA, and SIRTf Continuum Sensitivities



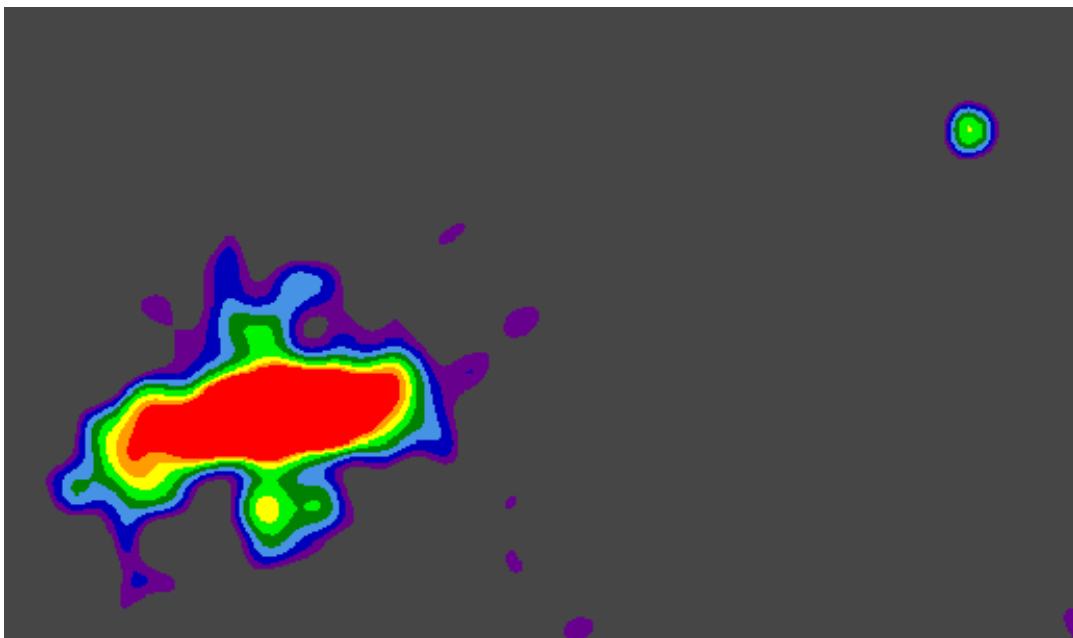
- Soon $\sigma = 1$ microJy at cm, mm, and far-IR wavelengths
- GSMT will match or improve on this sensitivity since
1 microJy equivalent to magnitude 24, 22, and 19 at V, K, and 10 microns

- In Jets and Outflows Greatest Synergies will Probably Come from:
- ▲ Evolutionary Studies (as in the Case of the Disks, Jets Evolve with Age of Star). With Evolution, “Optimal” Window Moves to Shorter Wavelengths. One Needs to Study Different Objects in Sky.



When do jets disappear? What is the relation with the Evolution of the Disk?

- ▲ One of the key problems in Jet-Disk field is to test Observationally MHD Model for Acceleration and Collimation of Jets (Blandford and Payne 1982).
- ▲ Angular Energy and Momentum are Removed from the Disk by the Jet.
- ▲ “Universal” Mechanism Proposed in Young Stellar Objects, Microquasars, and AGNs.
- ▲ With angular resolution of 10 mas and great sensitivity ALMA and GSMT will be in the position to search for Rotation Near the base of the Jet.
- ▲ Millimeter Recombination Lines May be Detectable At these Scales from the Ionized Jet. Furthermore, mm Recombination Lines may be Masing (as in MWC 349).

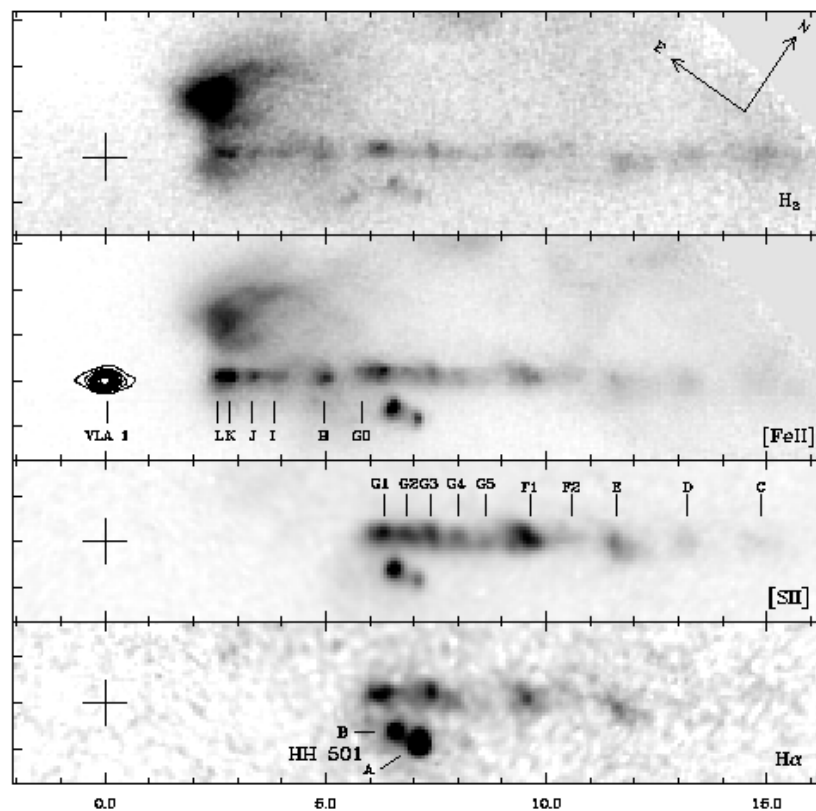


Quadrupolar Jet in HH 111

VLA-A, 3.5 cm

■ In Jets and Outflows Greatest Synergies will Probably Come from:

▲ Studies of Different Components of Phenomenon In the Same Source



HH 1-2

▲ Considerable Debate on Nature of Outflow at 0.1 pc Scale: True Jet than Entrain Molecular Gas, of Wide-Angle Wind?

▲ GSMT will Study Ionized “Core”, while ALMA Does Molecular “Envelope”

TASKS AND PROBLEMS

- ▼ Need to Model Ionized and Molecular Components of Outflow at Different Scales to Estimate what Should we Expect.
- ▼ Also Urgent to Model Evolution of Disk-Jet System to Compare with Combined ALMA + GSMT Observations.
- ▼ Is Dust Opacity a Problem Even at mm Wavelengths?
- ▼ Can We Study Jets and Outflows in Other Type of Sources (X-ray Binaries, PNe, AGNs) Using ALMA/GSMT?
- ▼ Other facilities? EVLA, Space