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

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:


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

▲ Considerable Debate on Nature of Outflow at 0.1 pc Scale: True Jet than Entrains 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