

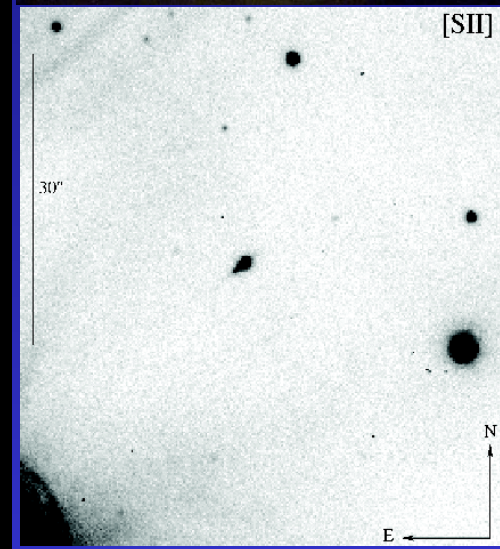
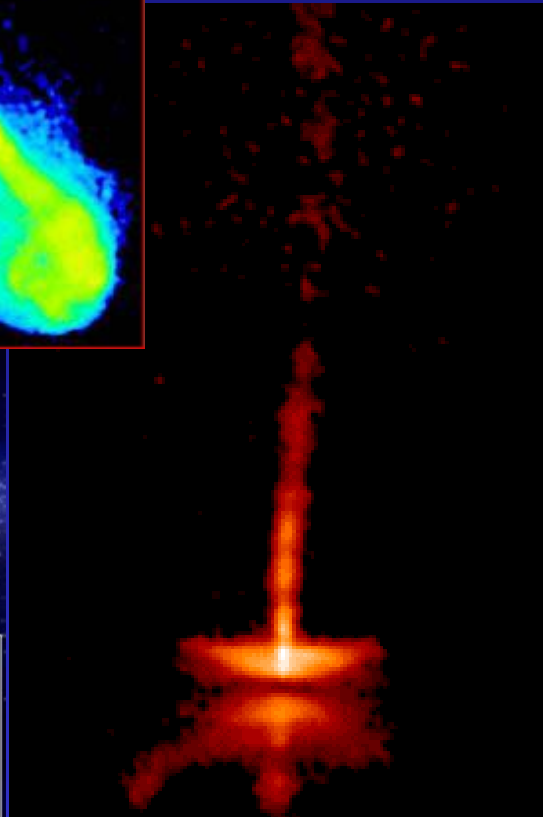
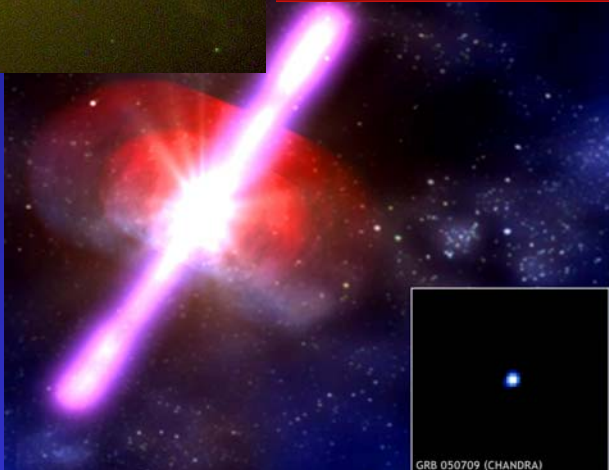
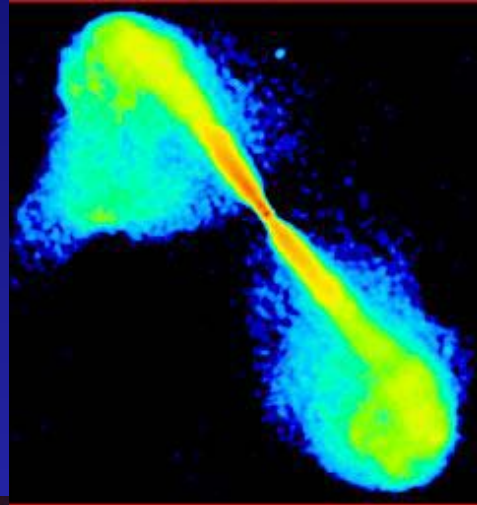
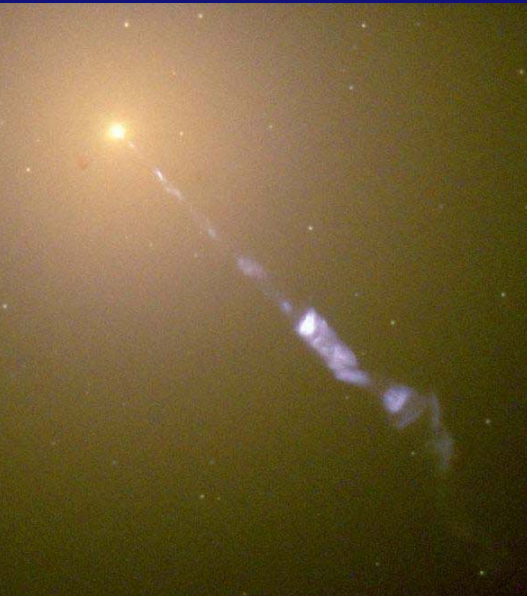
Investigating the launching mechanism of young stellar jets with LOFAR

Jochen Eislöffel



Thüringer Landessternwarte Tautenburg

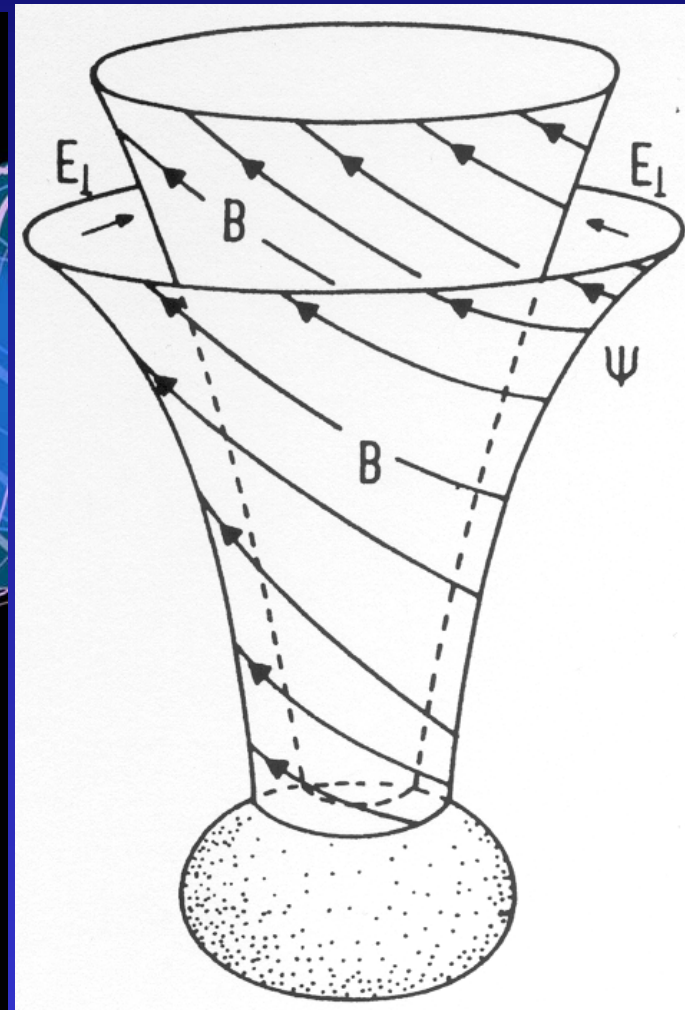
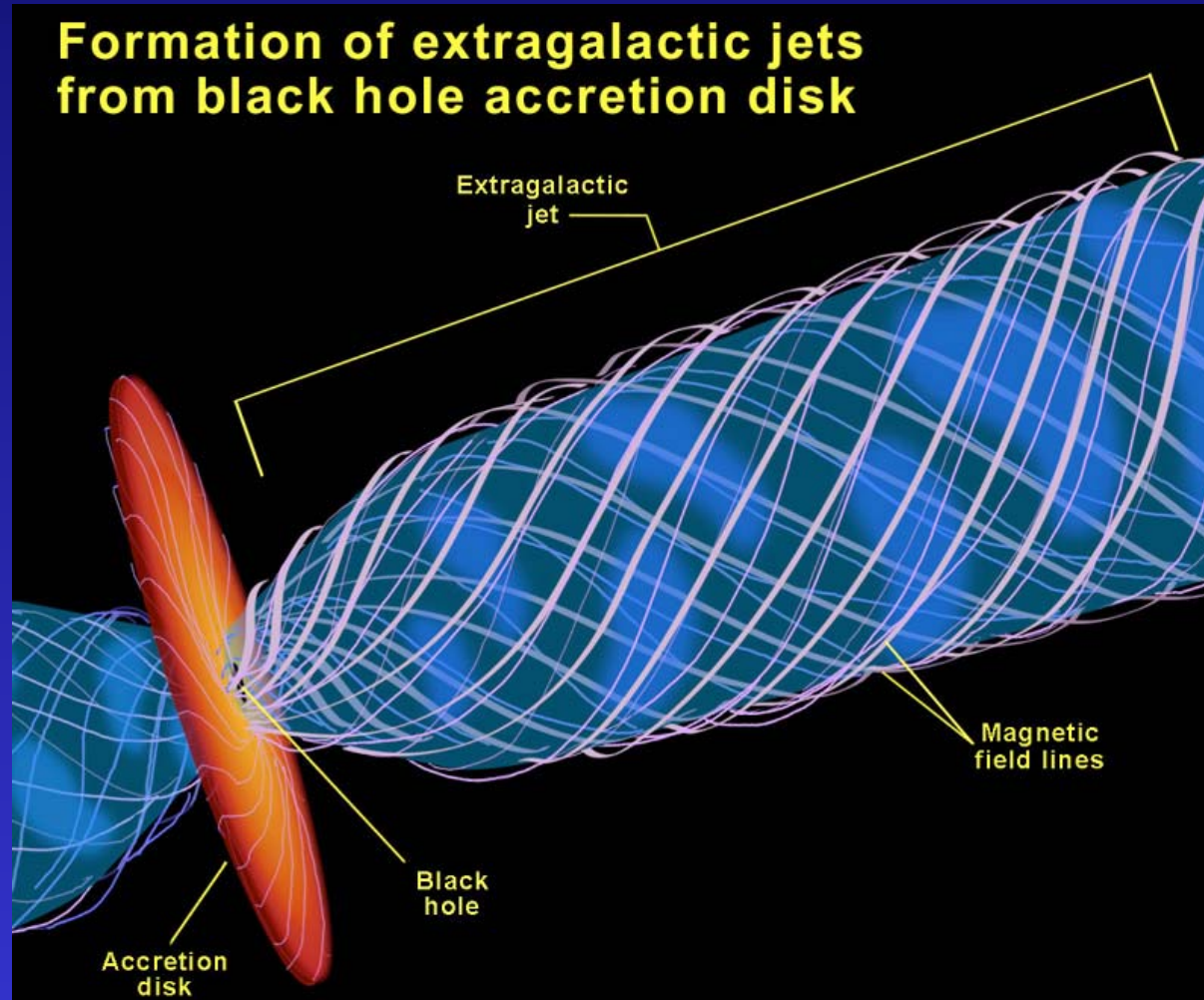
Accretion/ejection: from AGN central engines to brown dwarfs



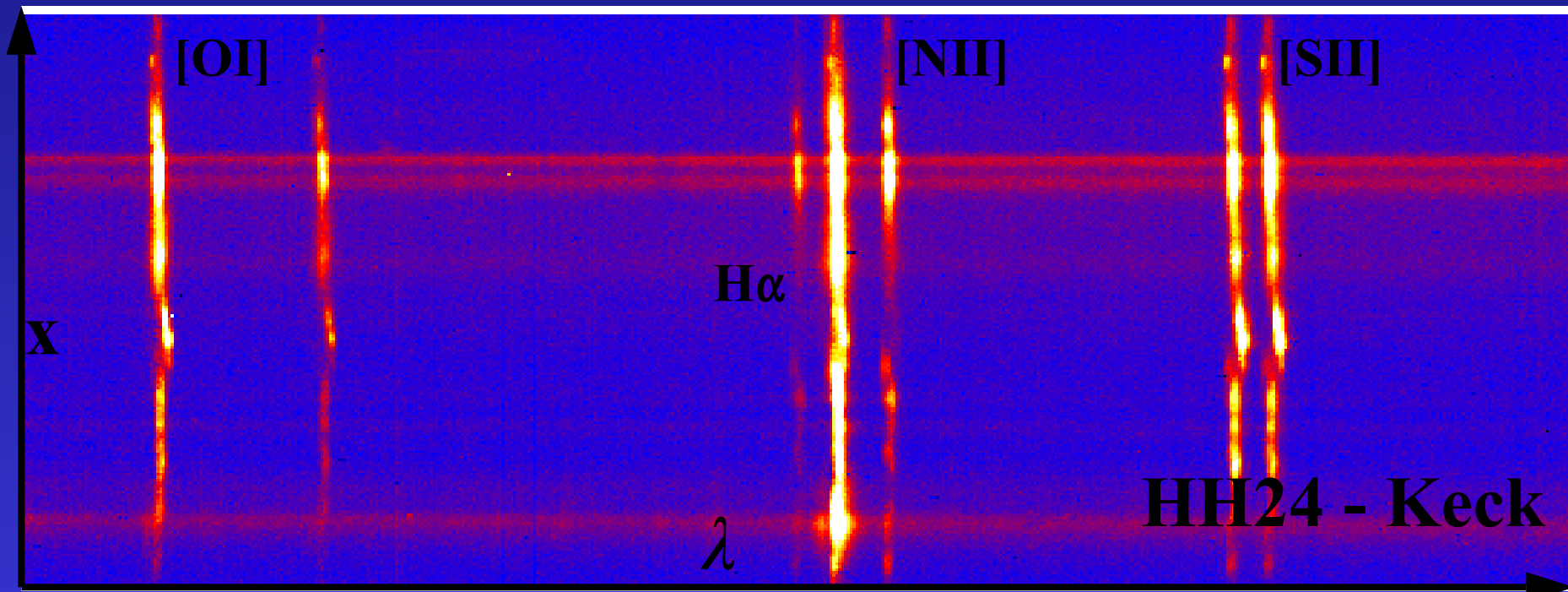
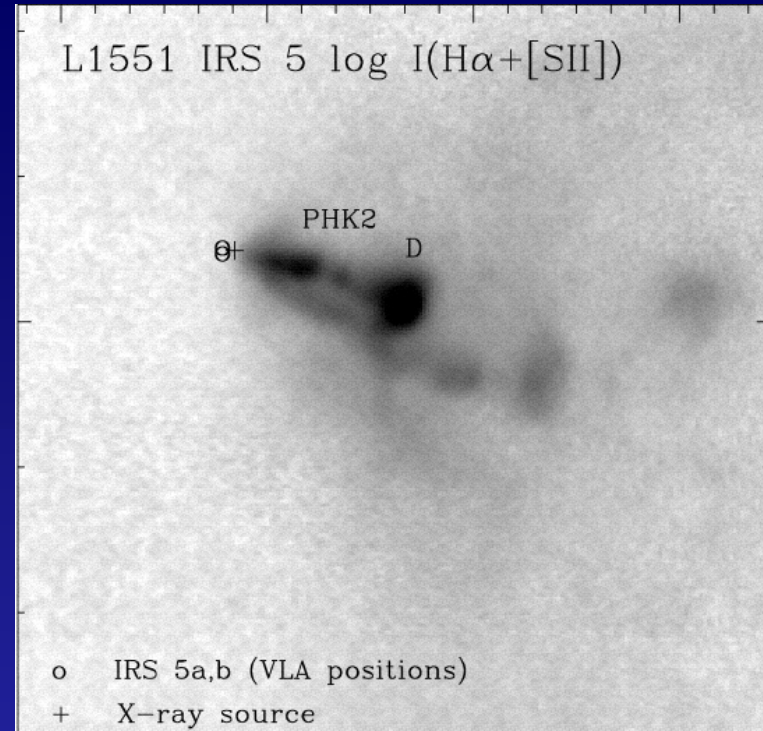
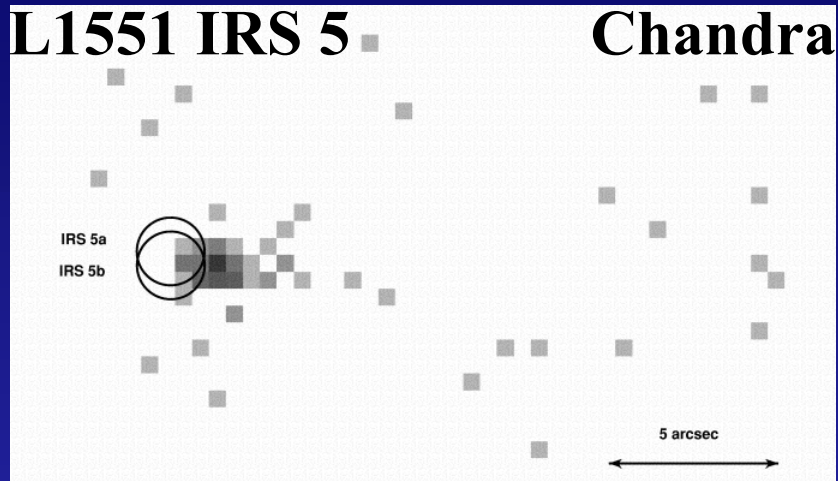
operates over ten orders of magnitude of mass of central object!

Formation and collimation of a jet by rotating magnetosphere

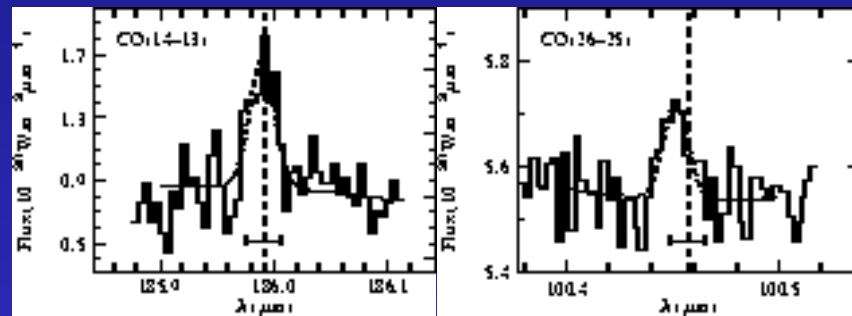
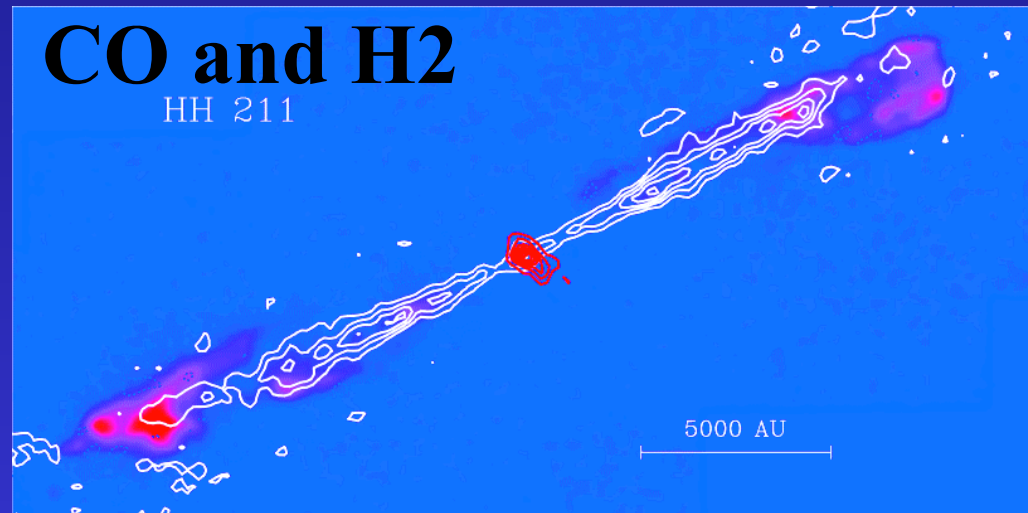
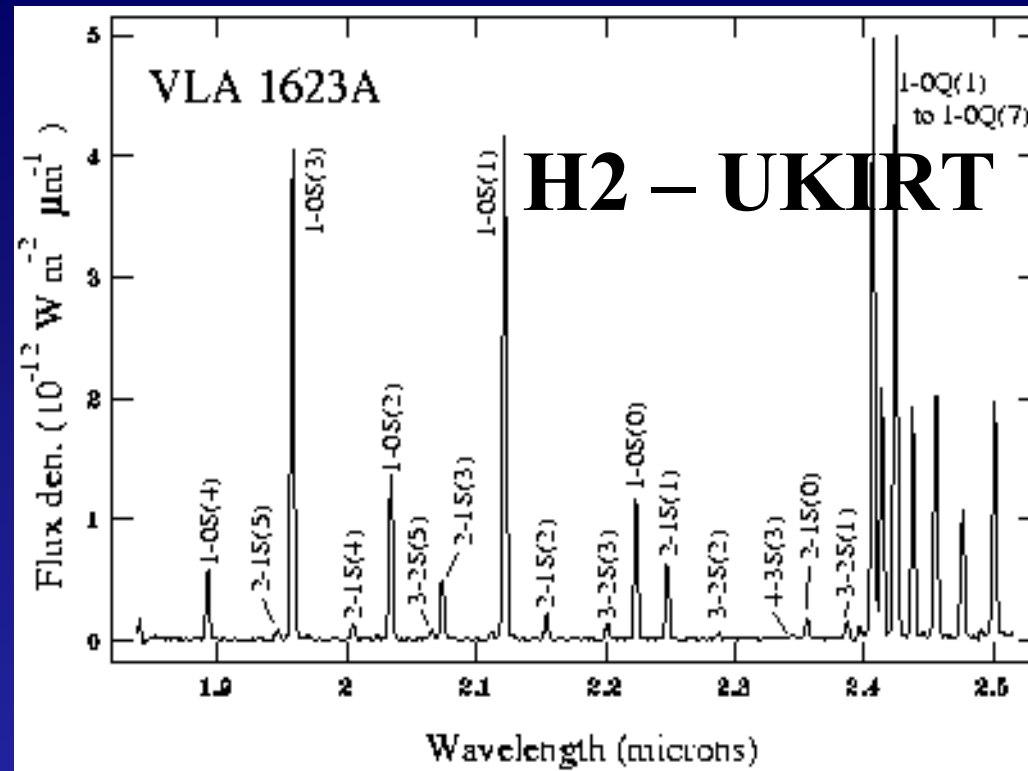
Formation of extragalactic jets from black hole accretion disk



Jet emission

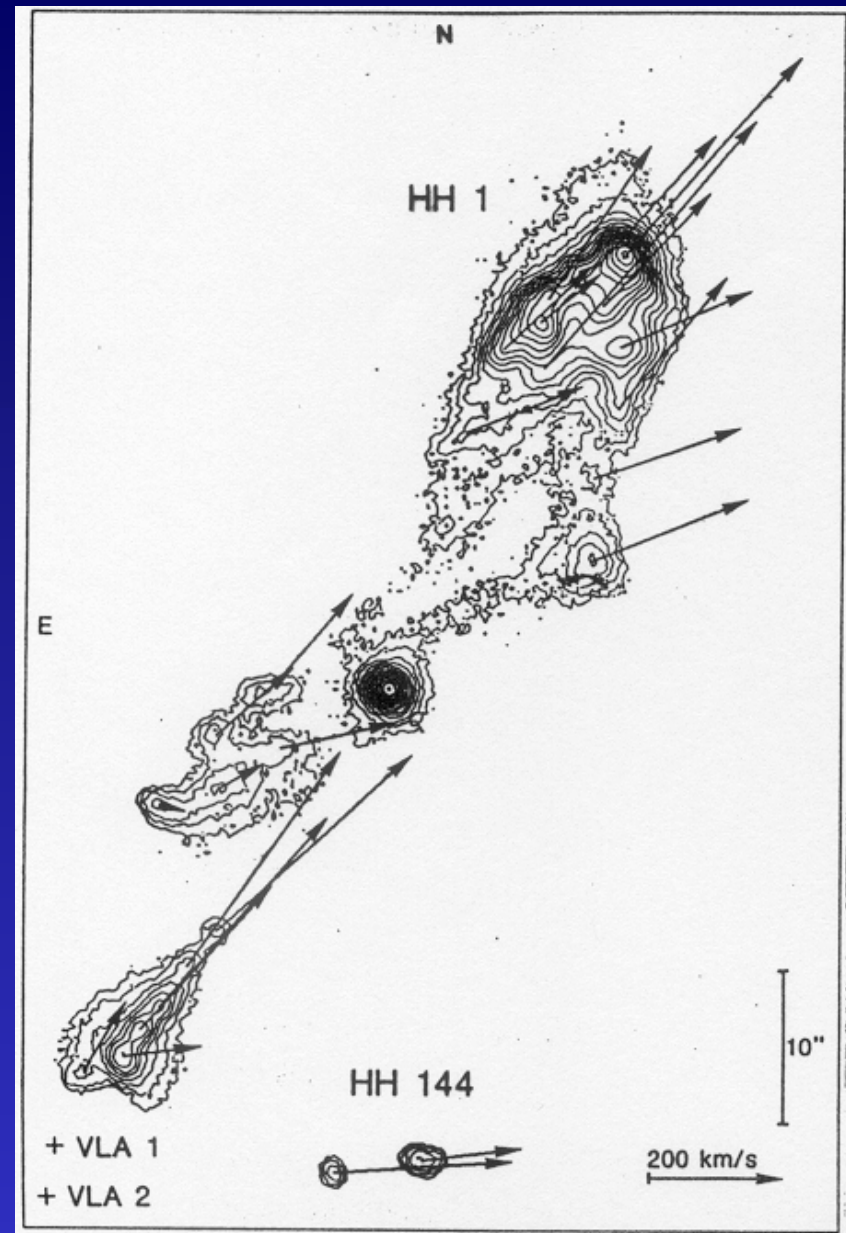
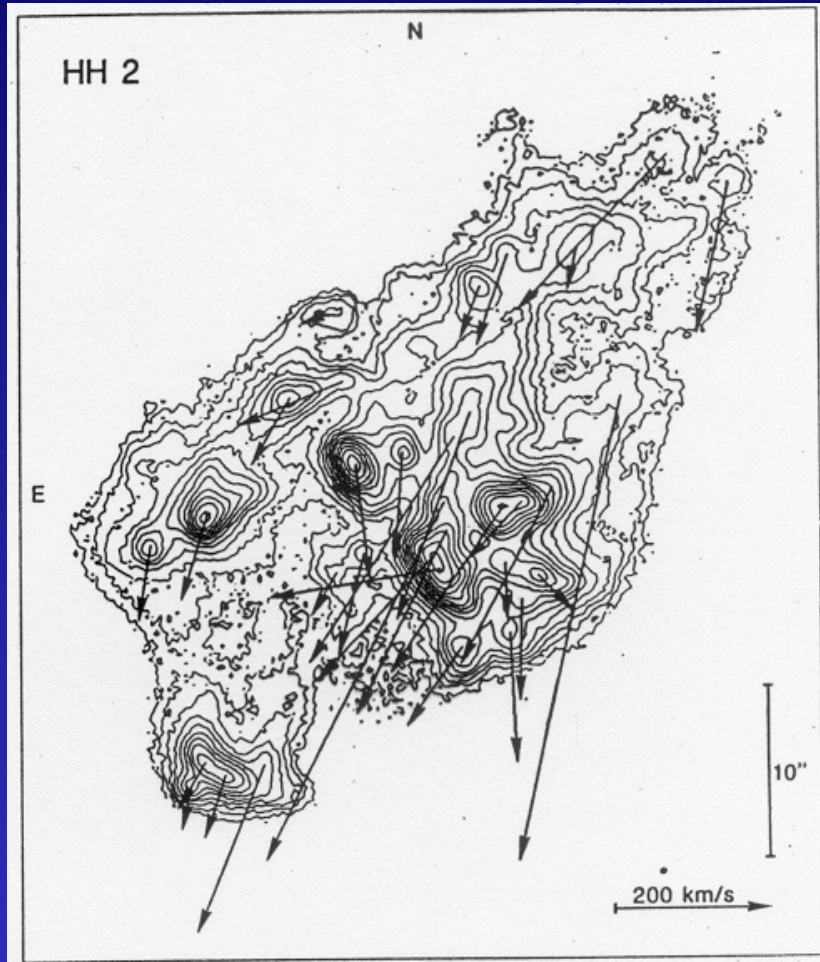


Jet emission



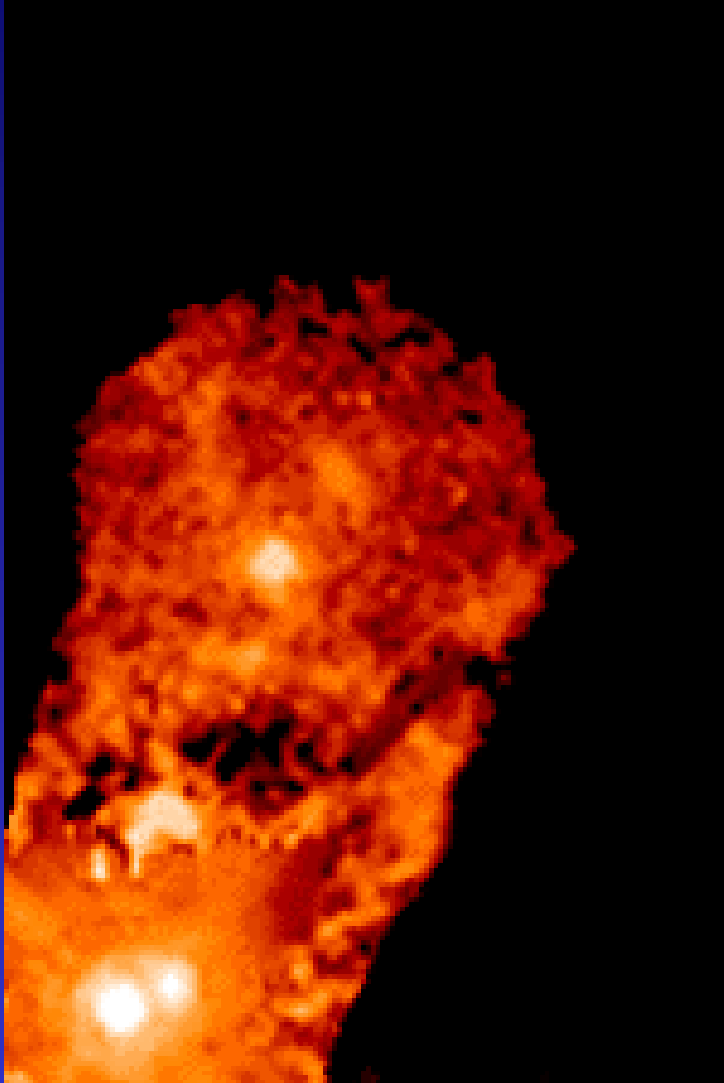
CO – ISO LWS

Proper motions I

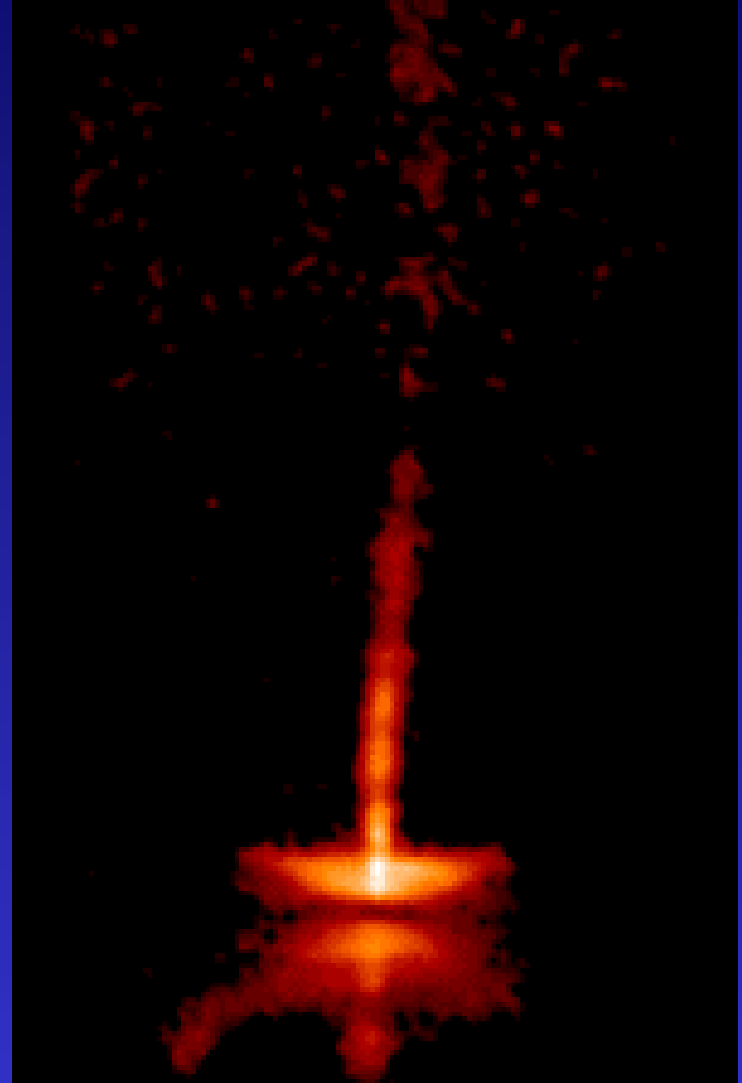


- identify sources
- knots move with tangential velocities of 100 – 400 km/s
- comparison with internal movement predicted by bow shock models

Proper motions II



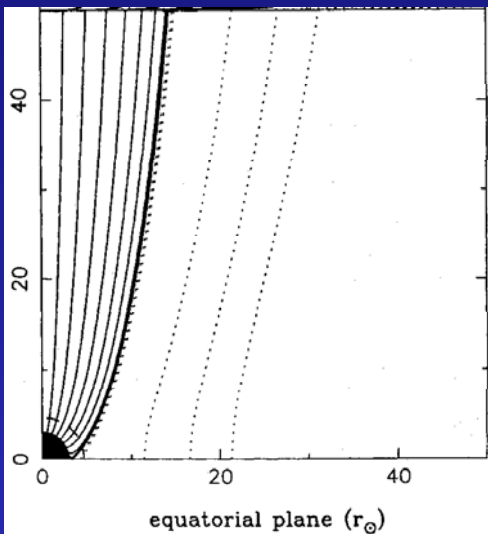
XZ Tau



HH 30

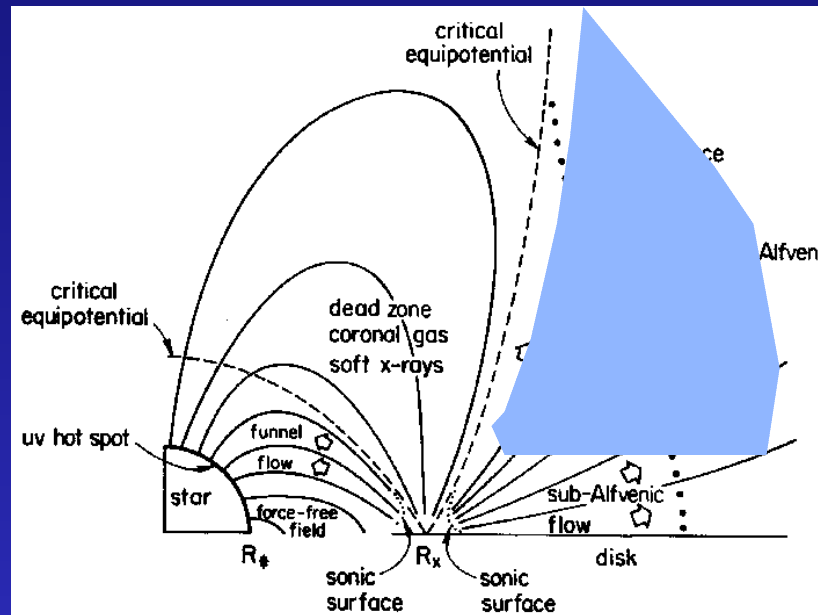
Understanding the central engine

Stellar winds



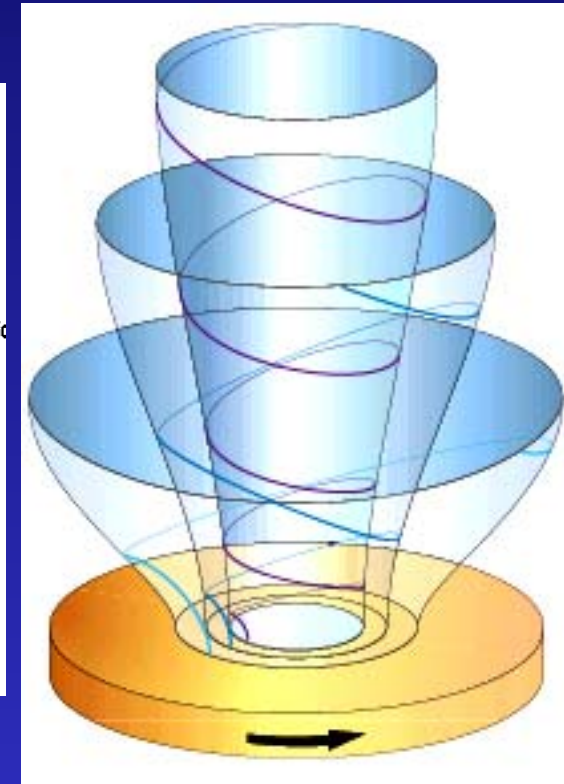
Parker 1958
Weber & Davis 1967
Hartmann & McGregor 1982
Lago 1984
Sauty & Tsinganos 1994, 2000

X-winds



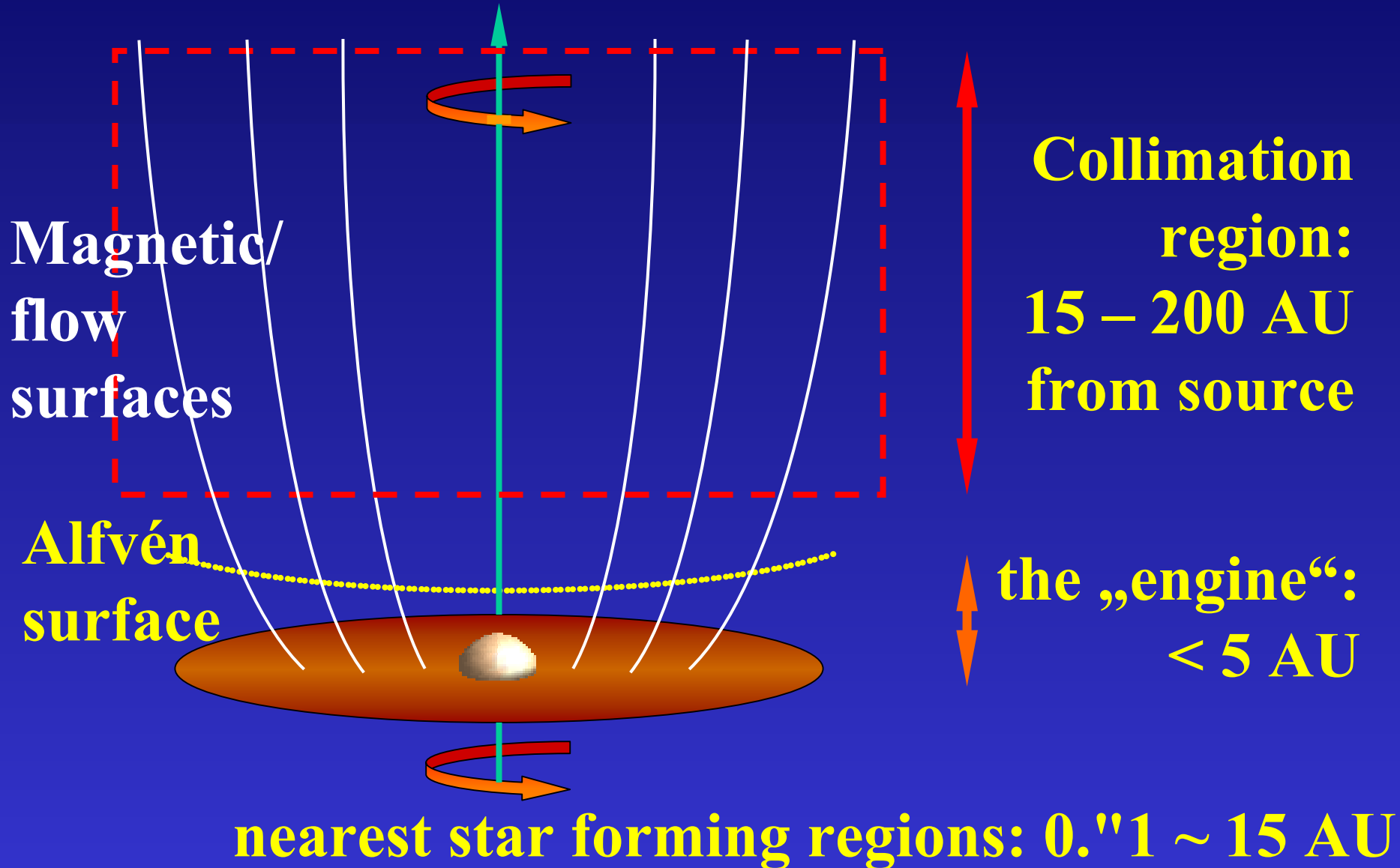
Shu *et al.* 1994
Shang *et al.* 2002
Lovelace *et al.* 1995, 1999
Fendt & Elstner 2000

Disk winds

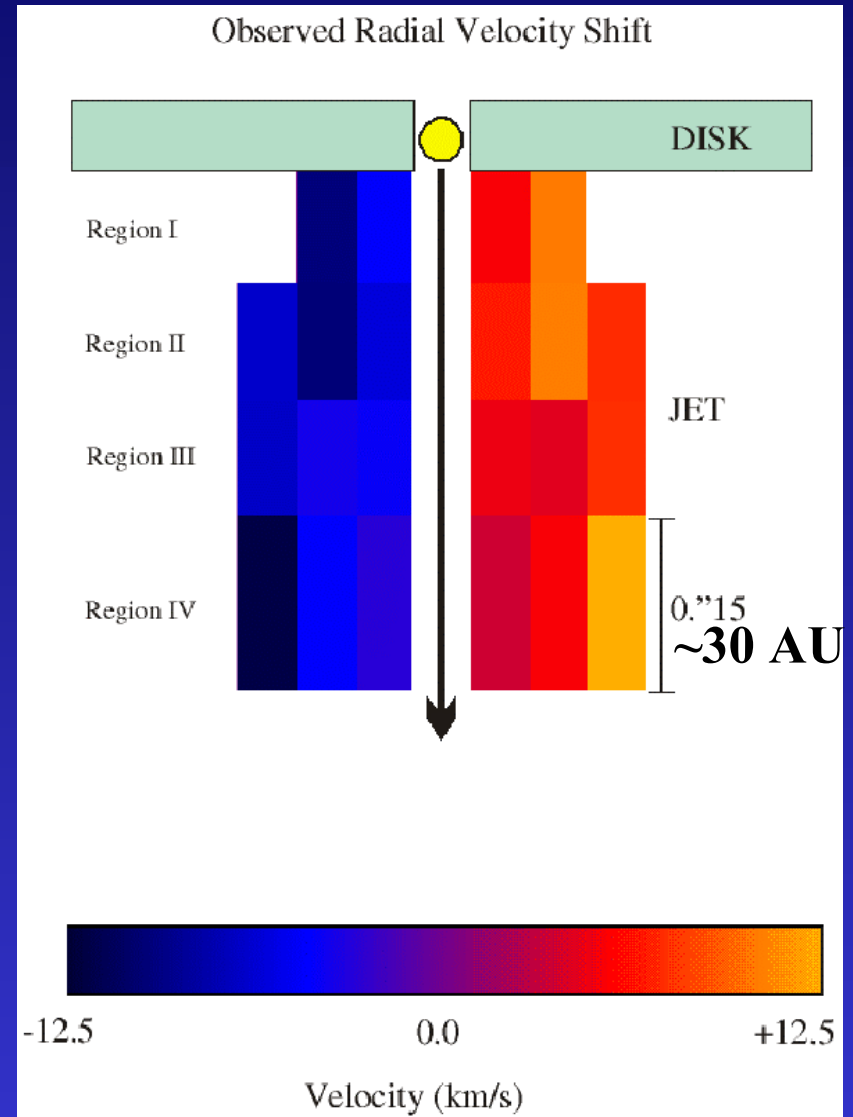
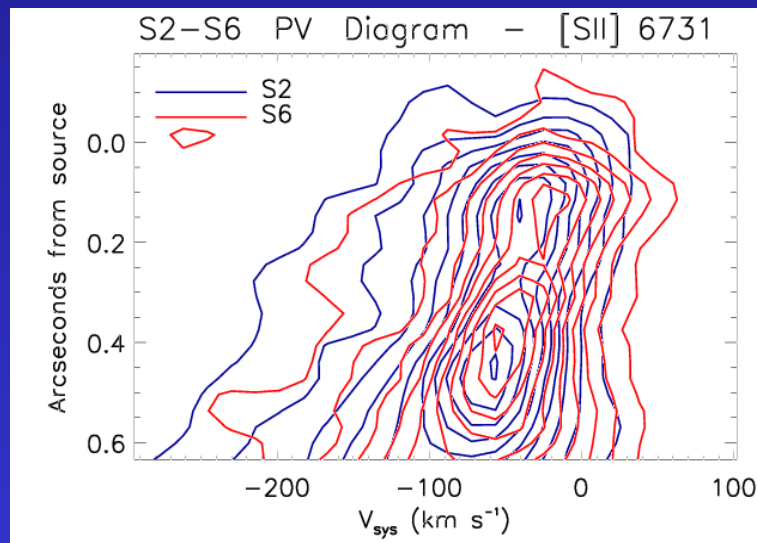
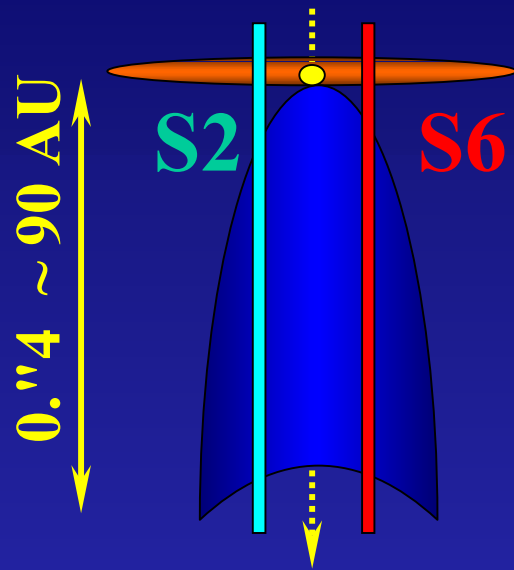


Blandford & Payne 1982
Camenzind 1990
Wardle & Königl 1993
Ferreira & Pelletier 1993, 1995
Casse & Ferreira 2000a,b

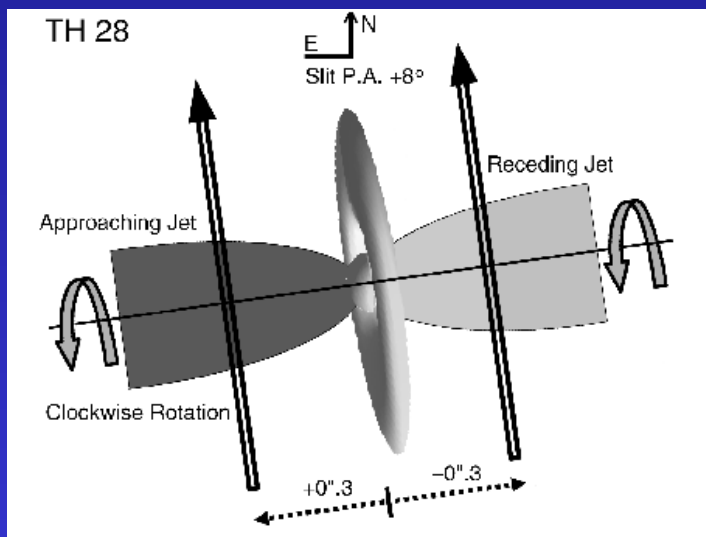
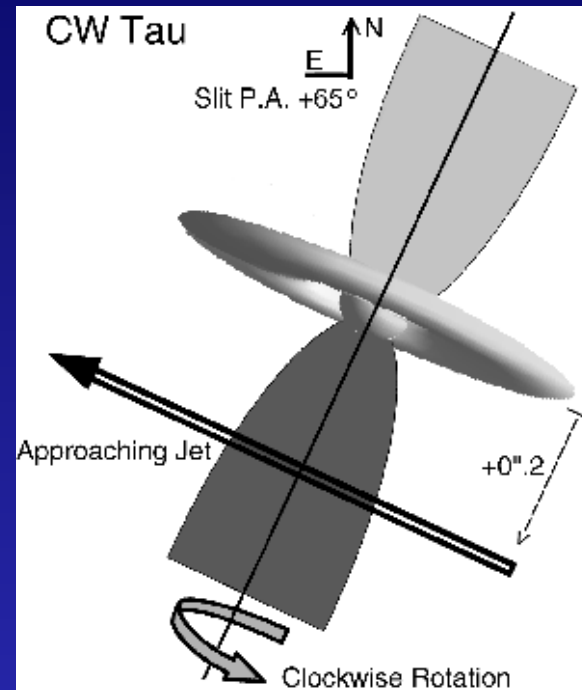
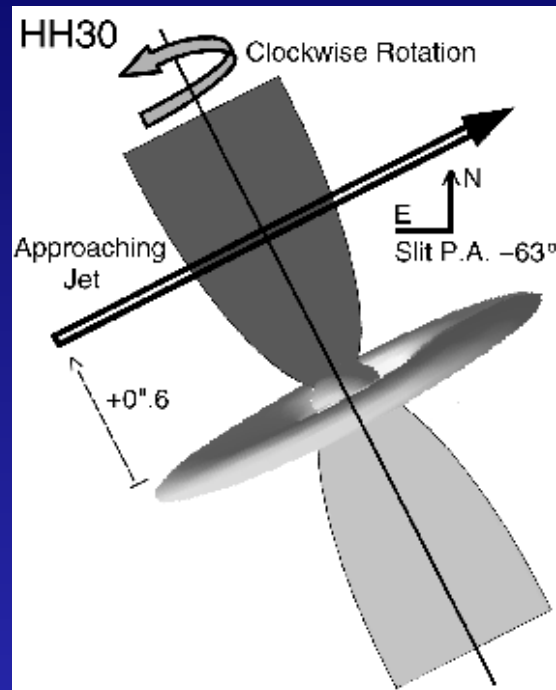
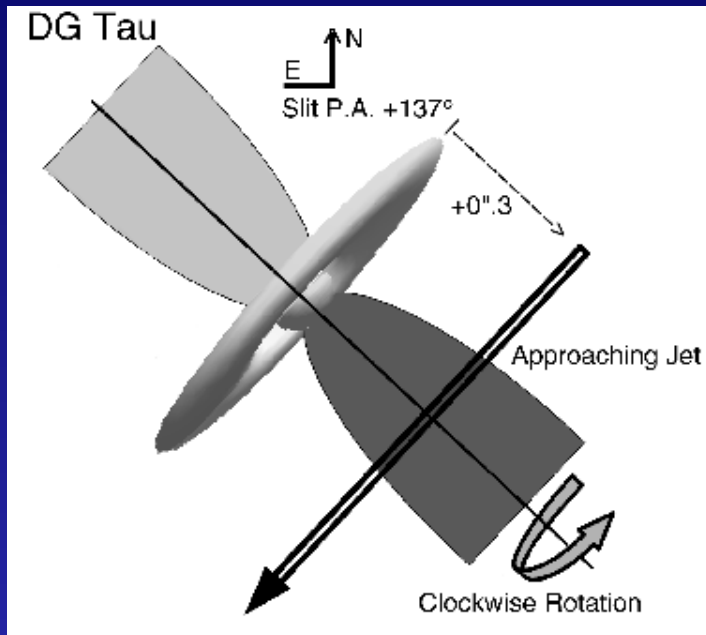
The need for angular resolution



Jet rotation: DG Tau

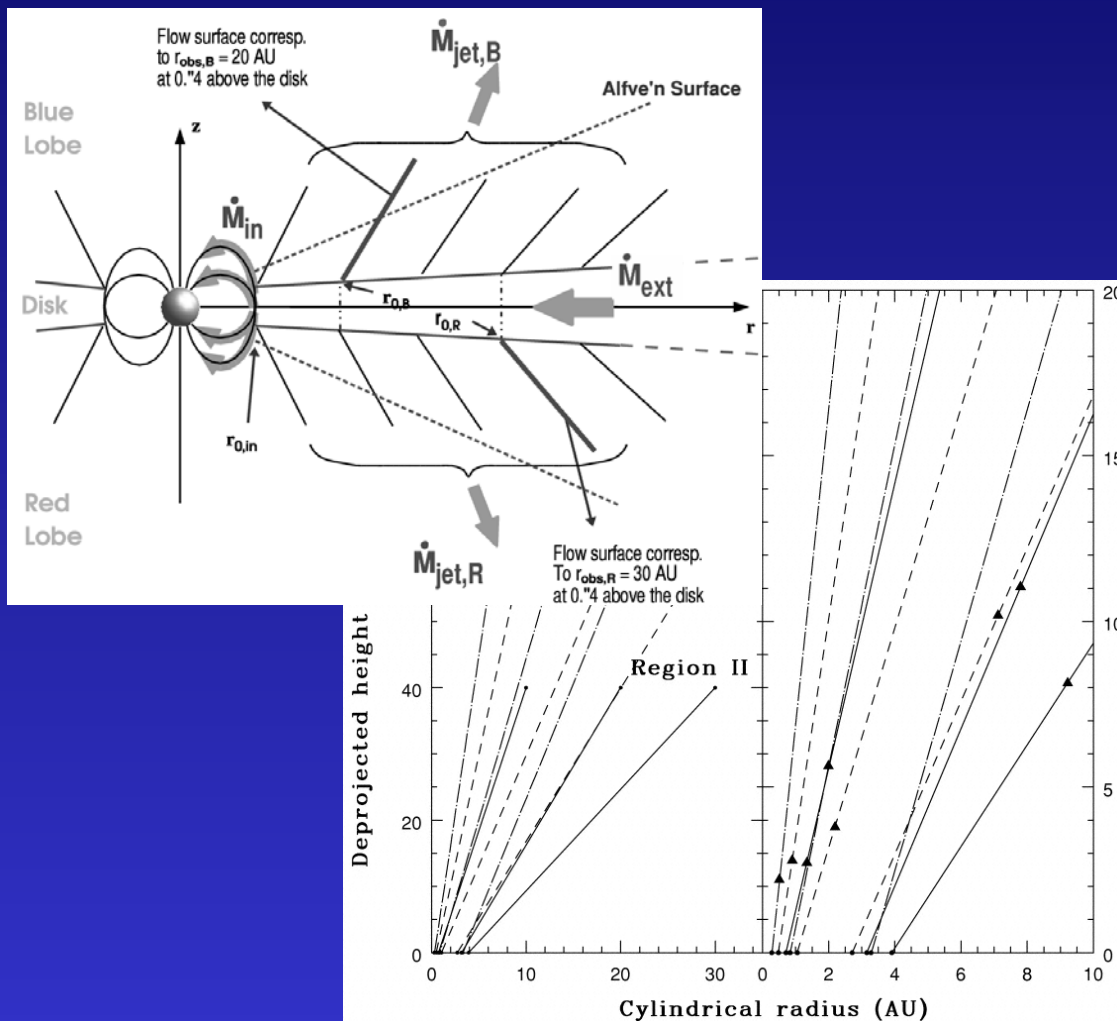


An HST survey for jet rotation



**radial velocity
asymmetries: 10-30 km/s**

Properties of the accretion/ejection structure

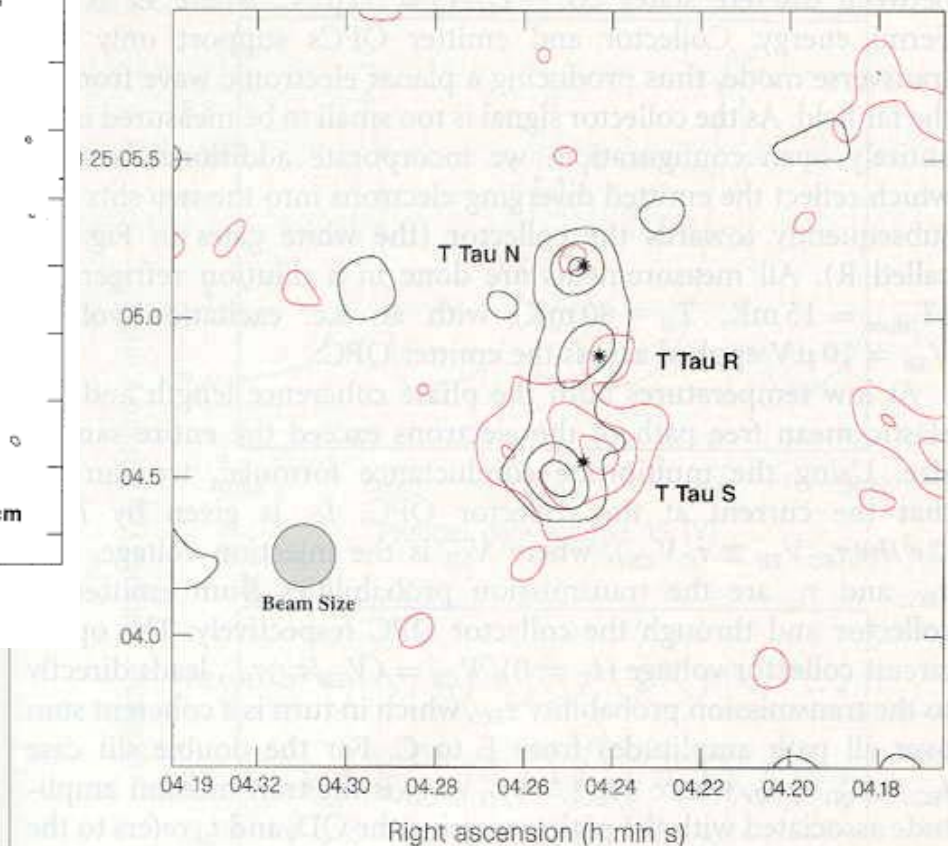
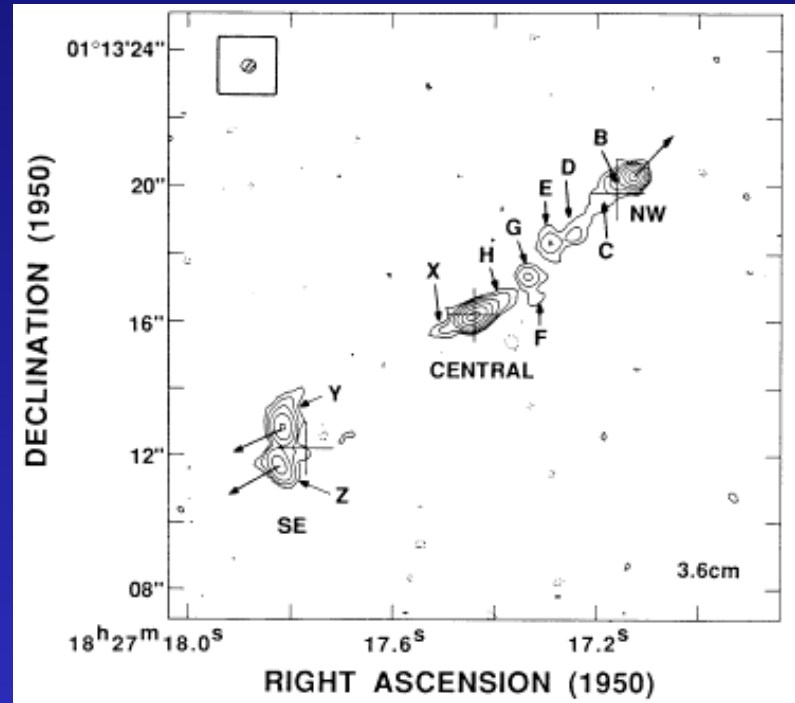
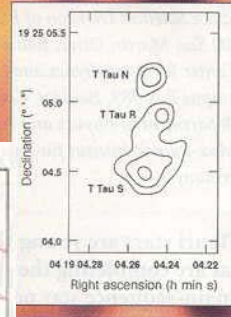
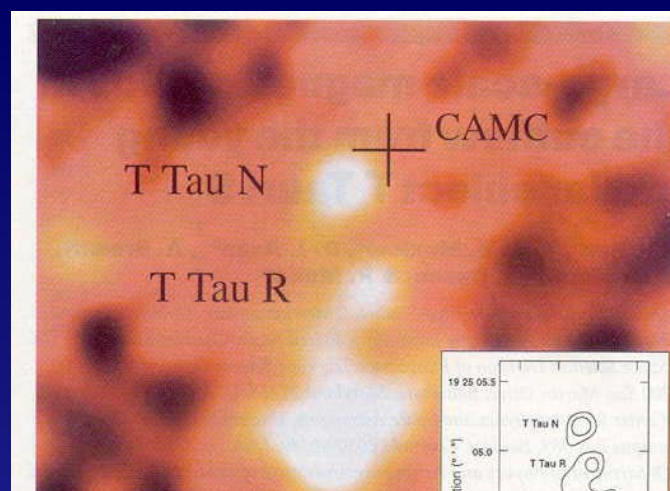


foot point radius \sim
0.1 – 3 AU

$B\phi/B_p \sim 4 - 8$

**Angular
momentum
extracted from
disk: 60 - 100%**

Non-thermal stellar jets



In addition to the known radio emission is observed between which may have been wrongly the Array discovery image (see extended in the northwesterly embedded young star. The Harlanberg Automatic Meridian is shown. The cross indicates plot of the same data of the 0.7 and 1.2 mJy.

Curiel et al. 1993

➔ LOFAR

Ray et al. 1997