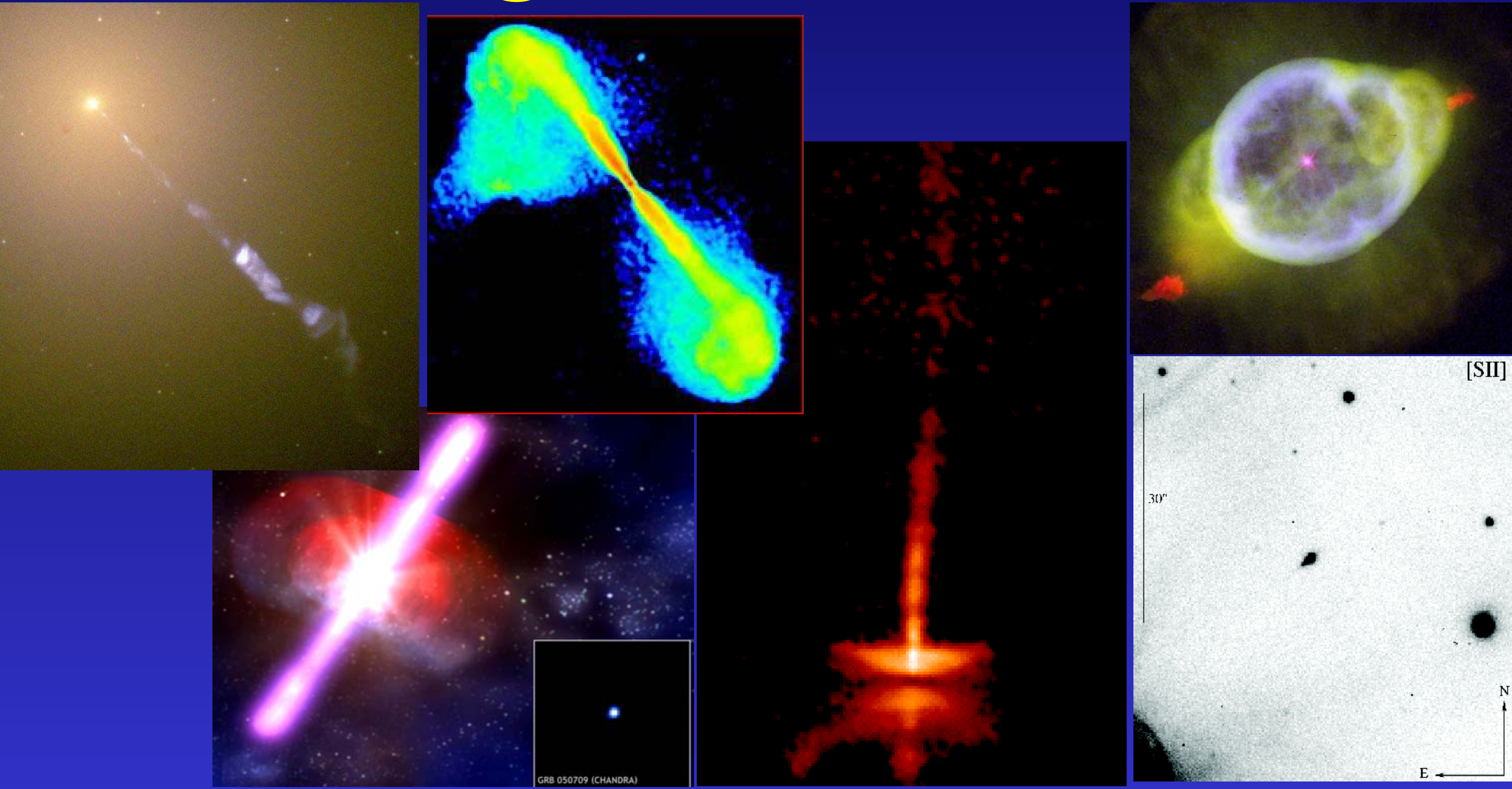
Jets from Young Stars and the impact of LOFAR

Jochen Eislöffel

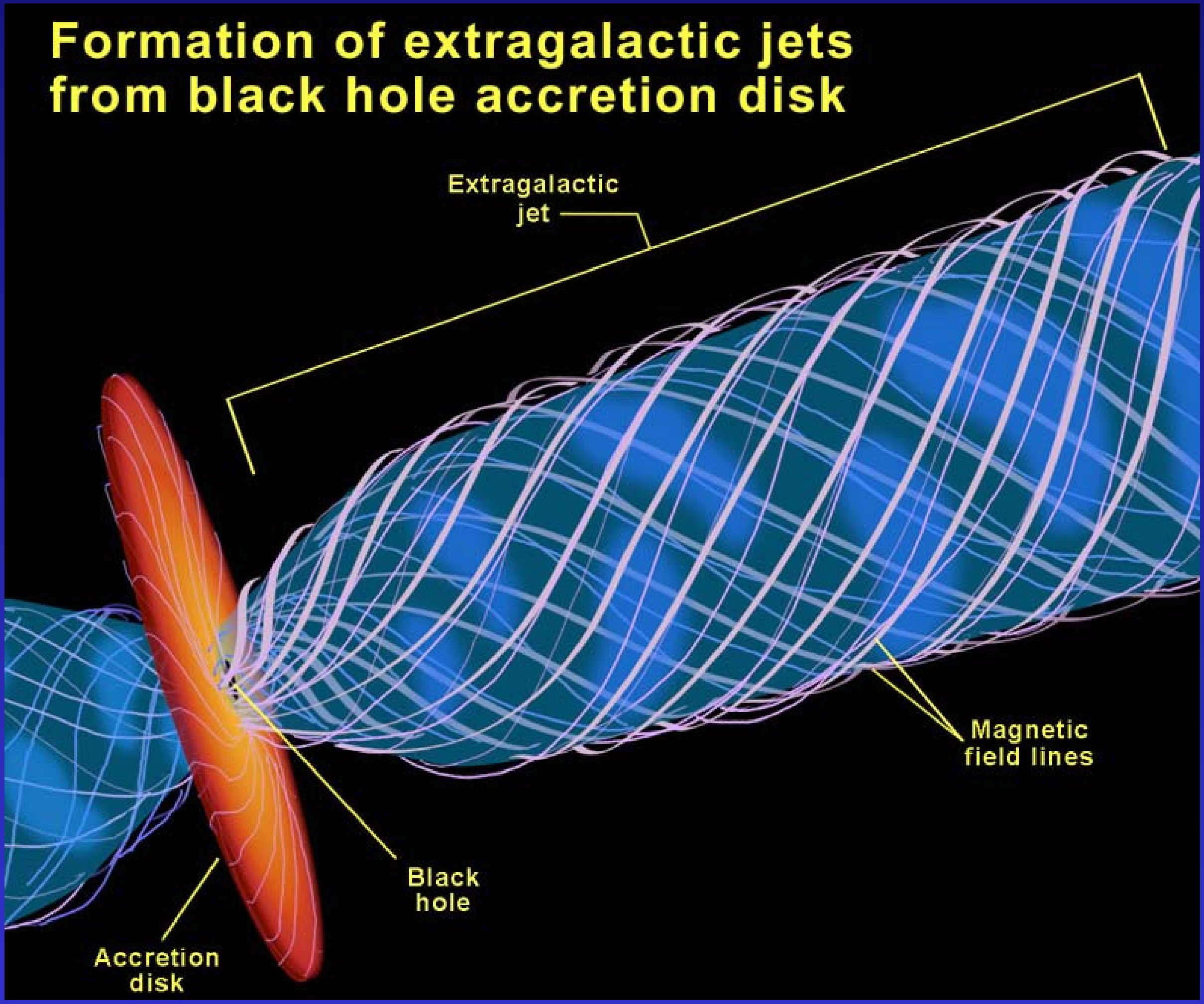
Thüringer Landessternwarte Tautenburg

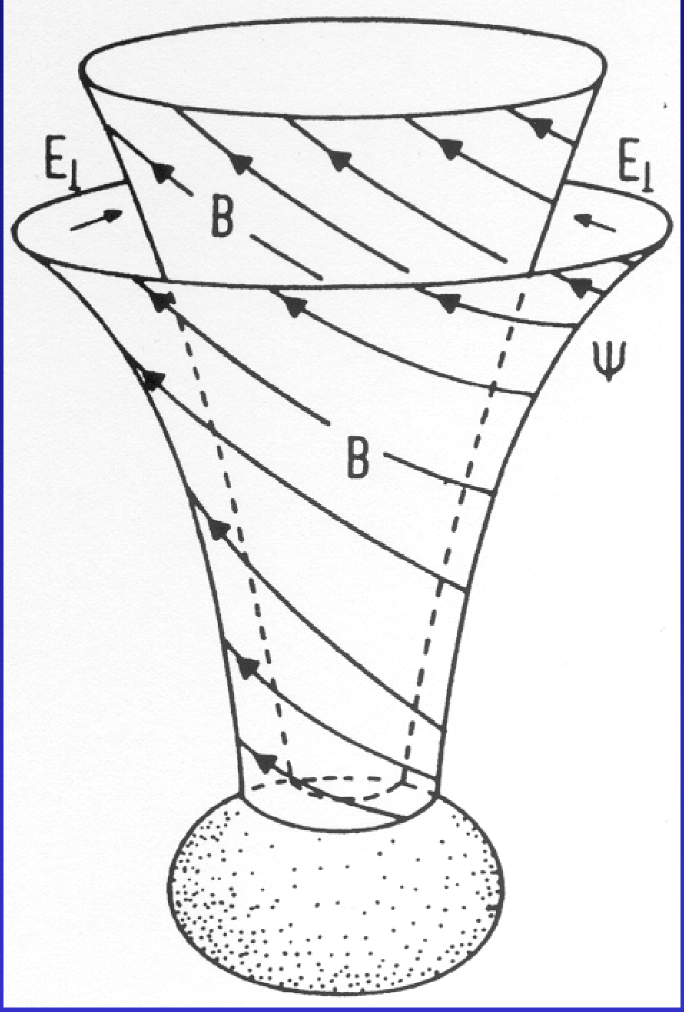
Accretion/ejection: from AGN central engines to brown dwarfs



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

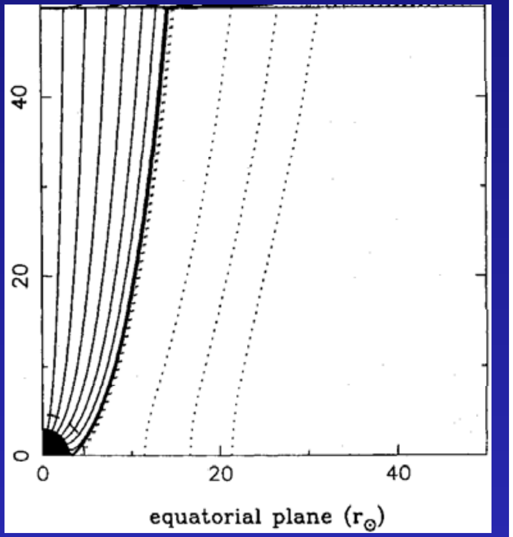
Formation and collimation of a jet by rotating magnetosphere



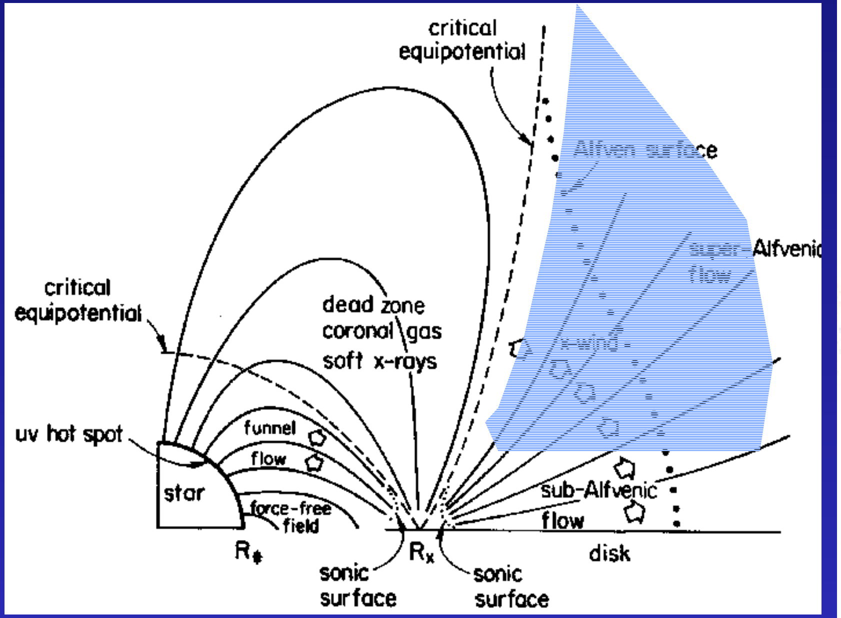


Understanding the central engine

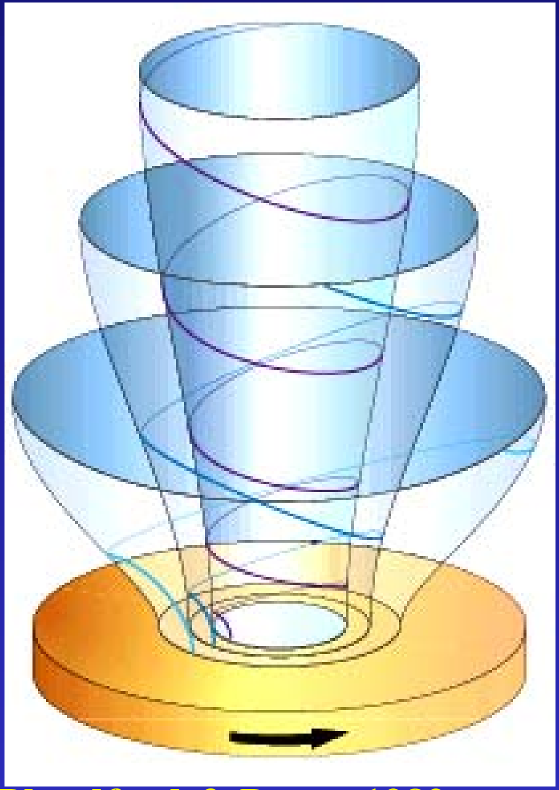
Stellar winds



X-winds



Disk winds

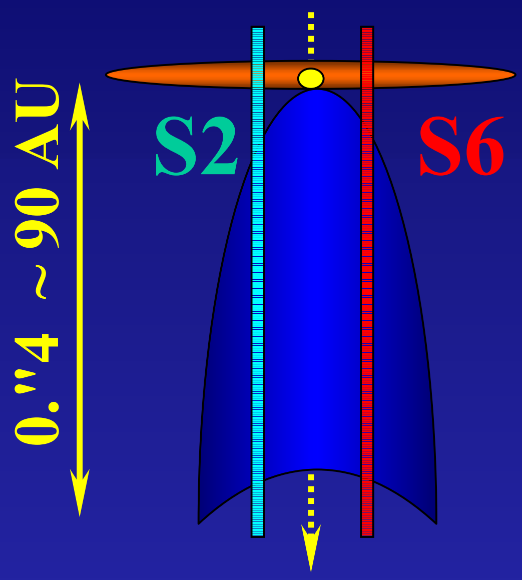


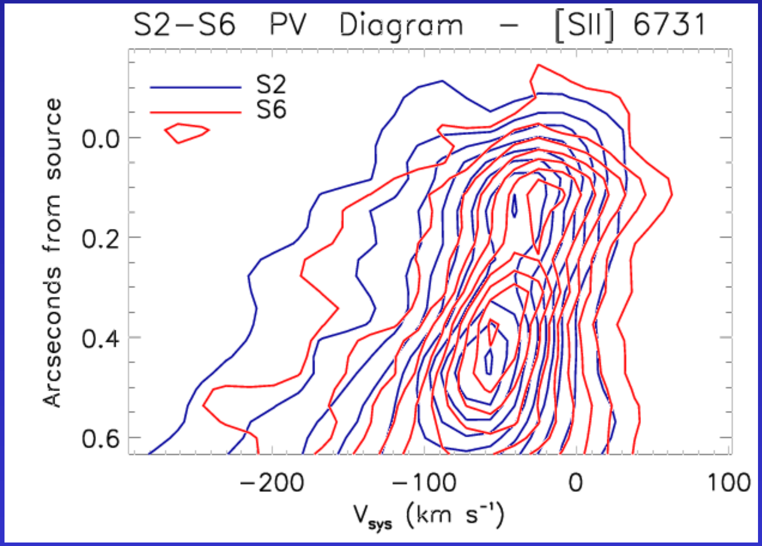
Parker 1958
Weber & Davis 1967
Hartmann & McGregor 1982
Lago 1984
Sauty & Tsinganos 1994, 2000

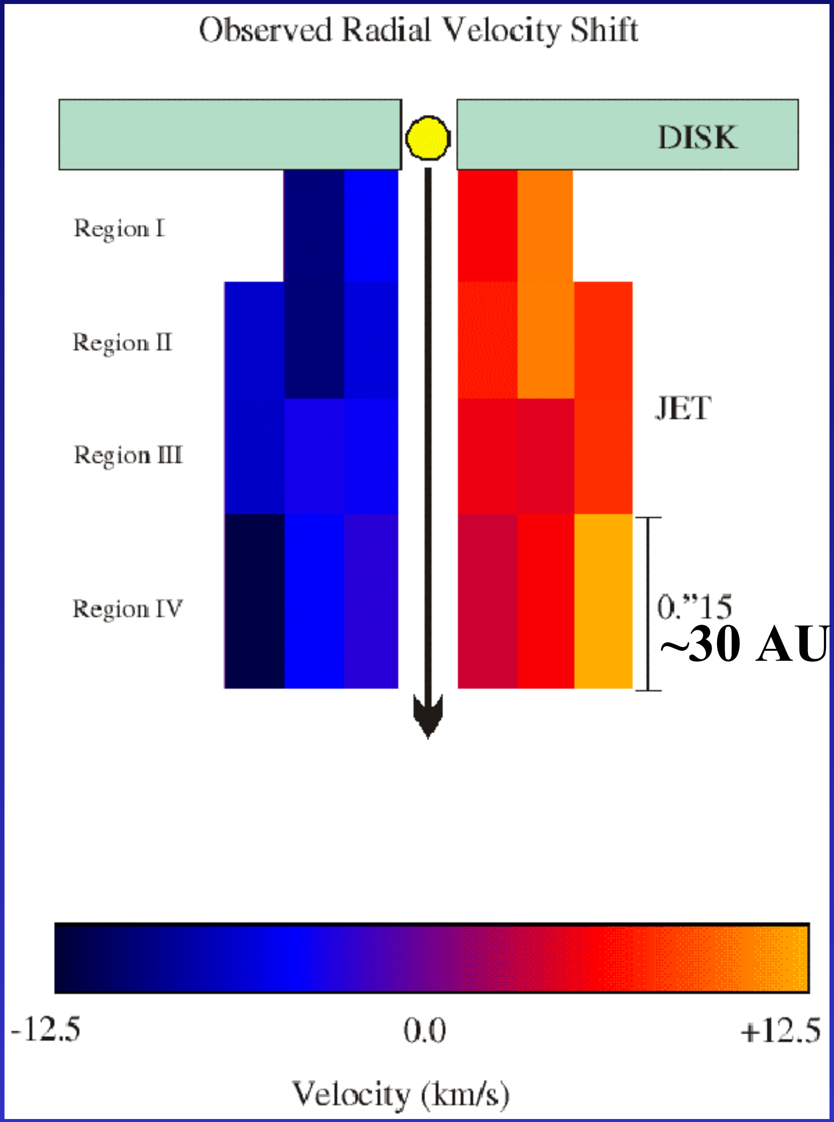
Shu *et al.* 1994
Shang *et al.* 2002
Lovelace *et al.* 1995,1999
Fendt & Elstner 2000

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

Jet rotation: DG Tau

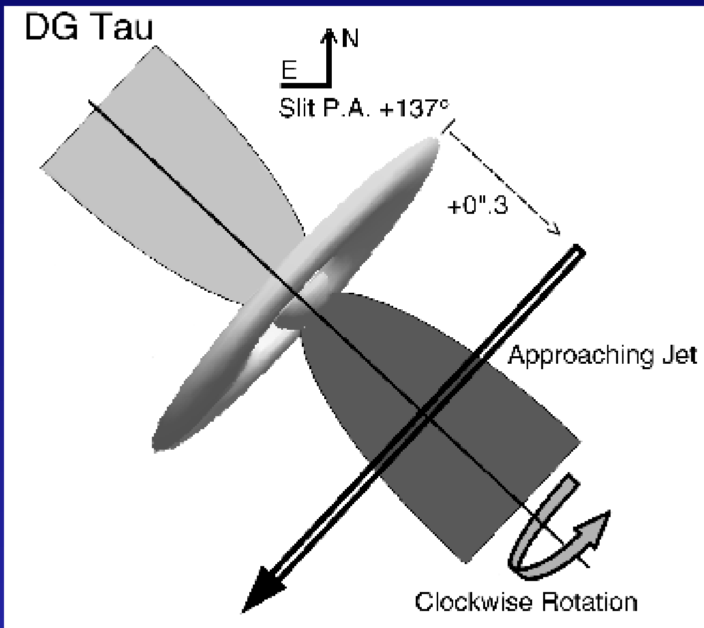


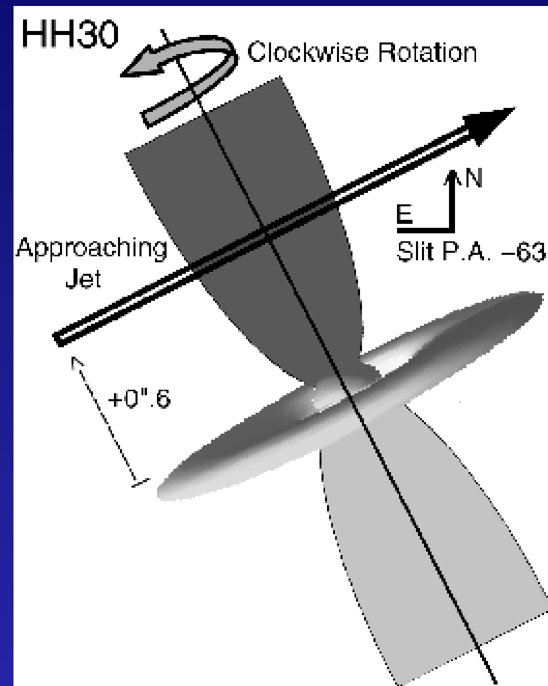


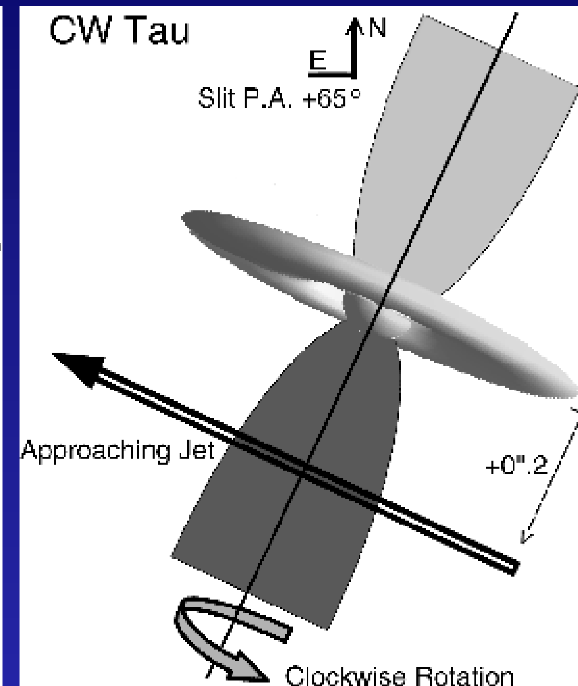


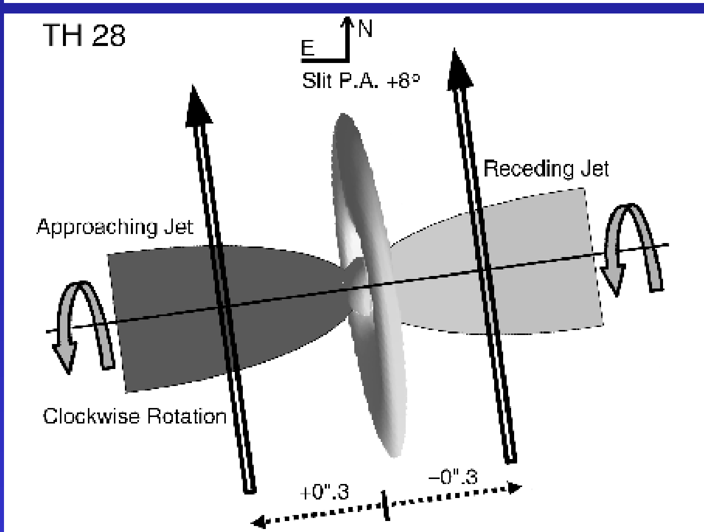
Bacciotti et al. 2002

An HST survey for jet rotation





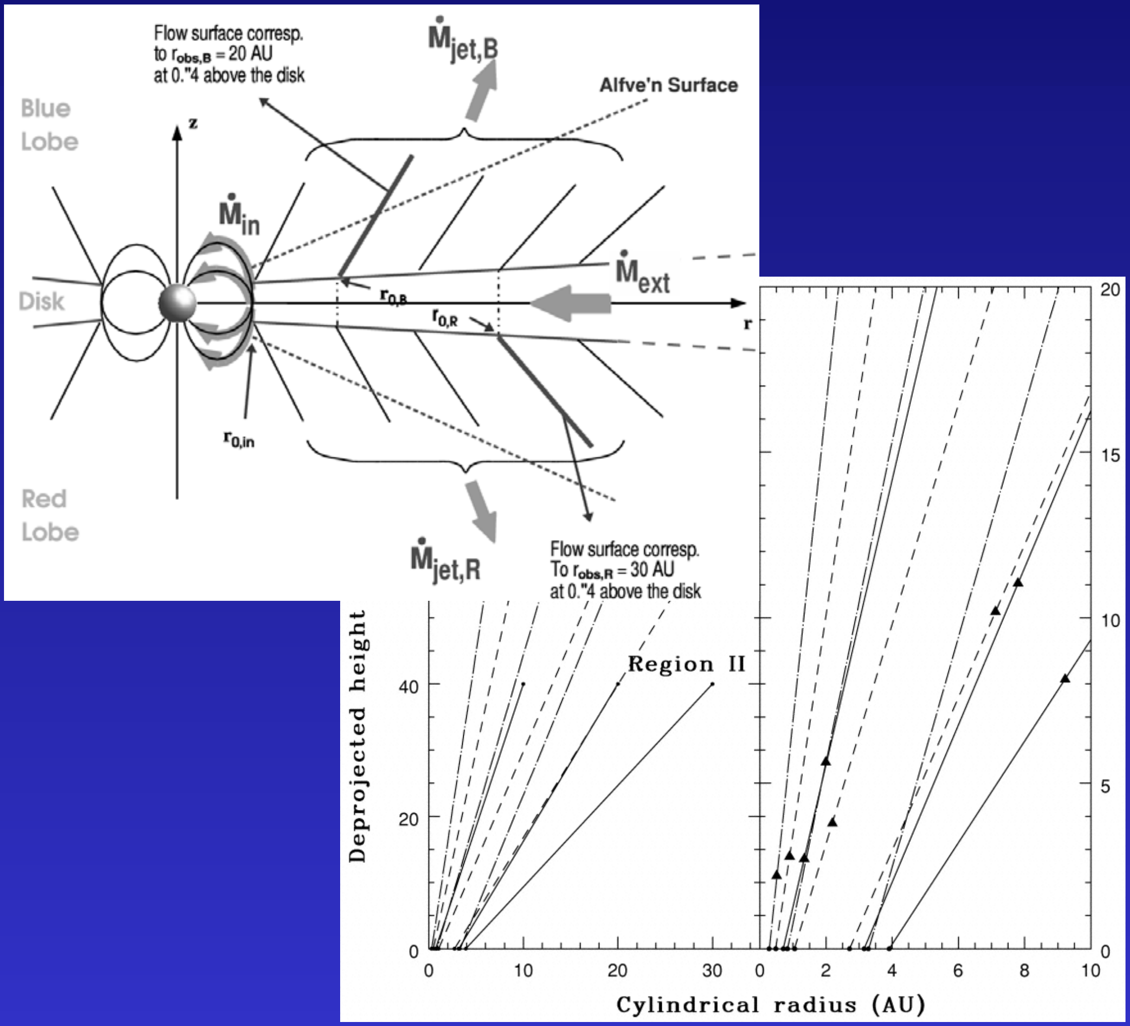




radial velocity asymmetries: 10-30 km/s

Coffey et al. 2004, 2007

Properties of the accretion/ejection structure



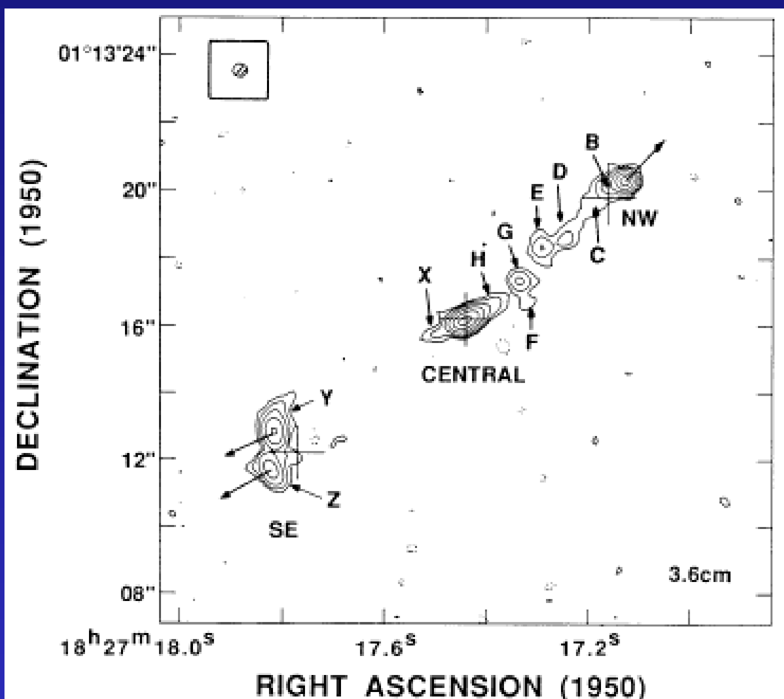
foot point radius ~ 0.1 – 3 AU

Bϕ/Bp ~ 4 – 8

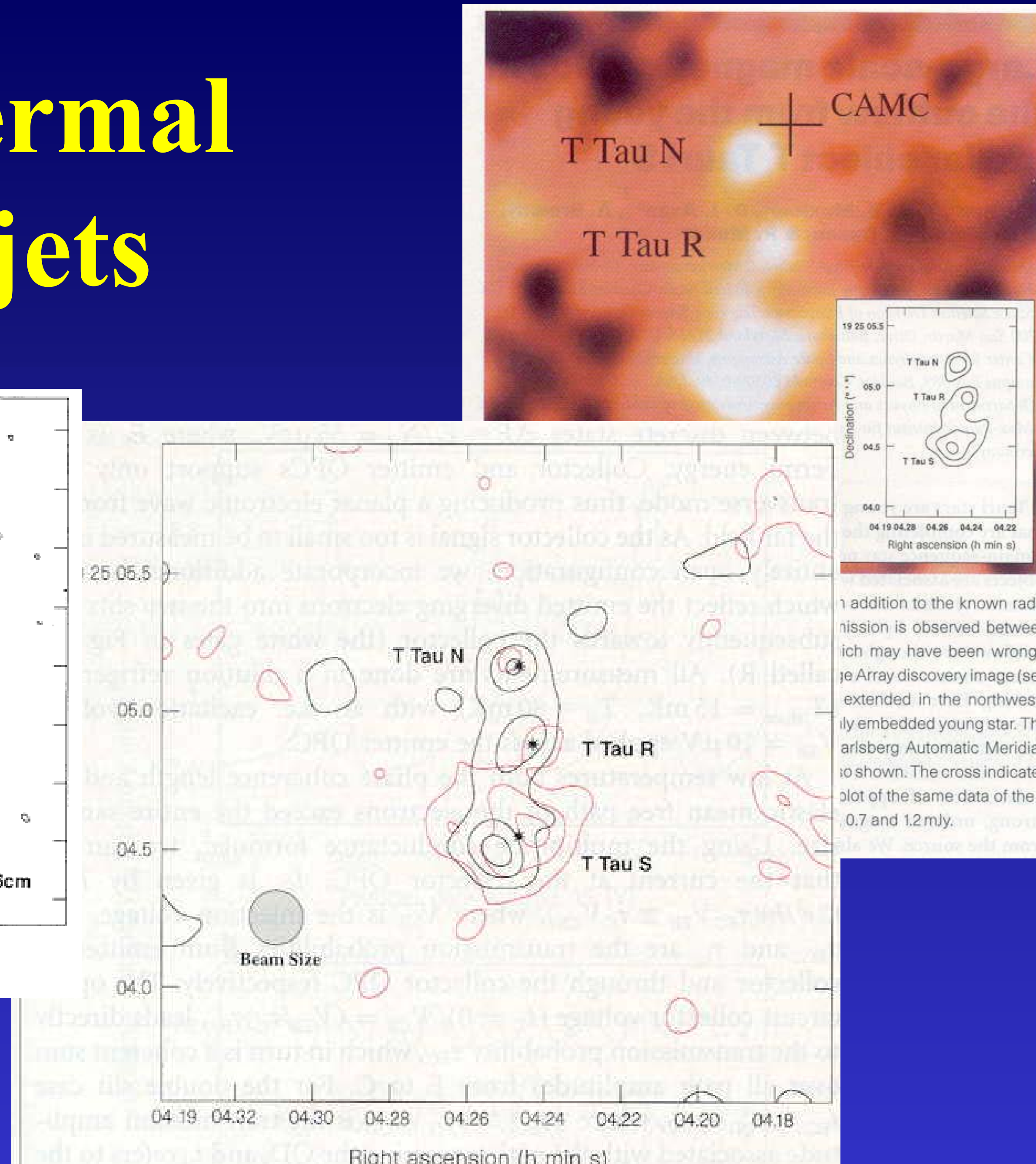
Angular momentum extracted from disk: 60 - 100%

Bacciotti et al. 2002, Anderson et al. 2003, Coffey et al. 2004, Pesenti et al. 2004, Woitas et al. 2005

Non-thermal radio jets



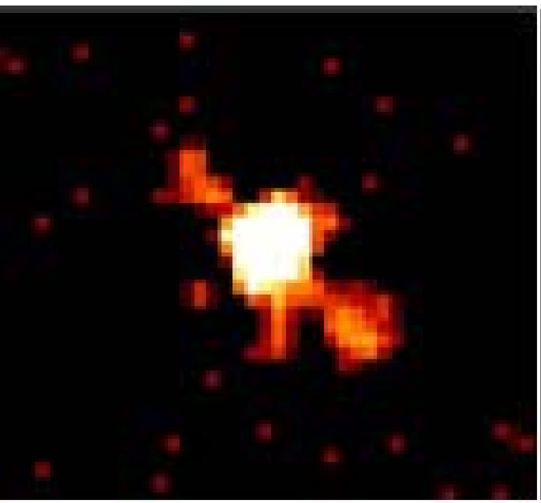
Curiel et al. 1993



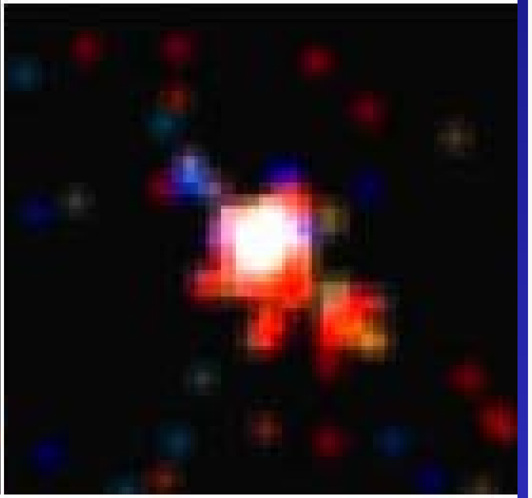
Ray et al. 1997

DG Tau X-ray jet

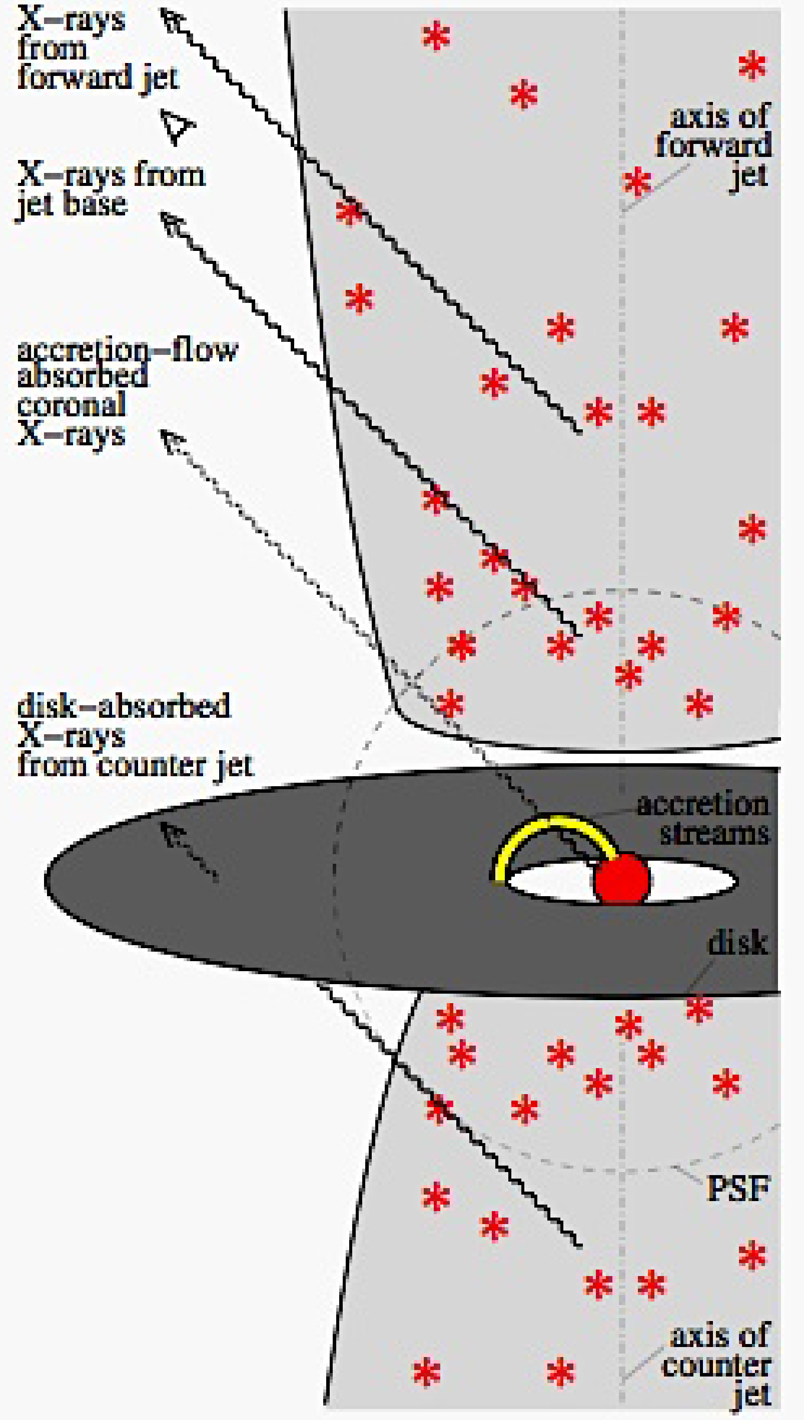
0.6-1.7 keV ACIS-S: DG Tau + jets



Smoothed



Colour-coded



Guedel et al. 2008

Jets from Young Stars with LOFAR

- Transients KSP
- Magnetism KSP