

Protostars: Chair's comments and Discussion

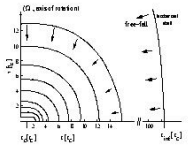
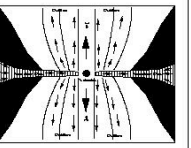
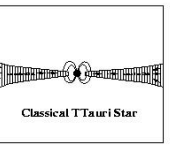
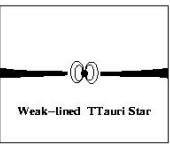
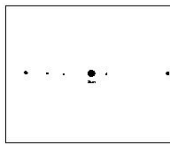
Define me a protostar:

Class 0/I sources vs. theory of protostars



Infalling envelopes

Proto-phases: free-fall
adiabatic
accretion

	Infalling Protostar	accreting Protostar	contracting PMS star		MS star
YSO Properties					
Phase	adiabatic (A,B,C)	accretion (D) deuterium burning onset of convection	convective radiative onset of nuclear burning		convective radiative full nuclear burning
Matter flows	mostly infall disk & outflows form	some infall mostly accretion outflows, jets	low accretion	?	-----
Envelope / Disk size	< 10000 AU	< 1000 AU	< 400 AU	~ 100 AU	-----
Infall / Accretion rate	10^{-4}	10^{-5}	10^{-6} - 10^{-7}	?	-----
Age	10^4 - 10^5 yr	10^5 yr	10^6 - 10^7 yr	10^6 - 10^7 yr	-----
Emission bands (except IR)	thermal radio X-ray	radio X-ray	radio optical strong X-ray	nontherm. radio optical strong X-ray	nontherm. radio optical X-ray
Classes	class 0	class I	class II	class III	ZAMS

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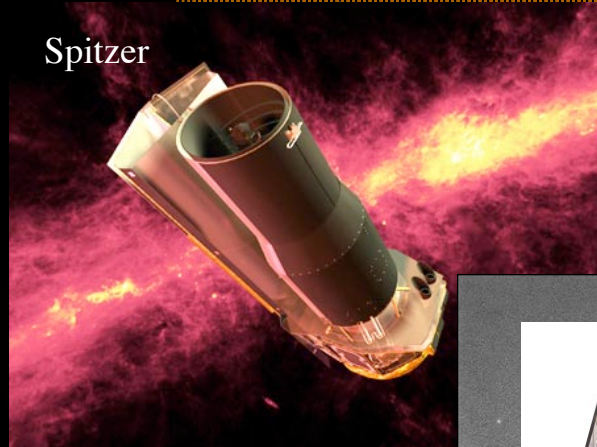
Continue to observe SEDs over wide IR bands:

Class 0 vs. class I

Infalling thick envelopes



Envelopes and evolved PS



Spitzer



Herschel

D^r HERSCHEL



SOFIA

Stratospheric Observatory For Infrared Astronomy



JWST

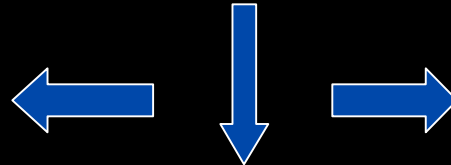
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X-rays from protostars:

Beyond the mere detection

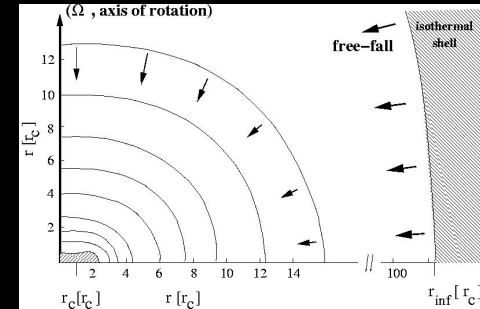
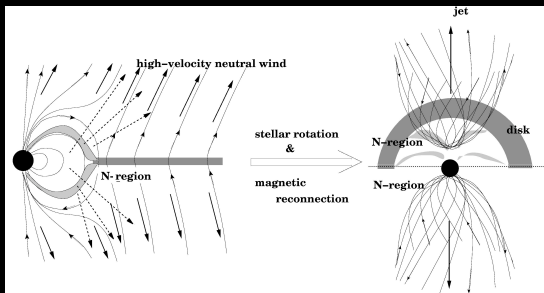
Go deep!

Various forms of magnetic activity



Other?

Accretion streams & shocks



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Define me a protostar: IR classes versus protostellar phases

Continue to observe SEDs over wide IR bands: envelopes and protostars

X-rays from protostars: beyond the mere detection ; go deep

How can we observe various protostellar phases

Observe and identify special accretion stages: FU Ori's , EX Ori's , etc...

Search for massive protostars at all wavelengths

The wicked dating game