

Suggestions for Literature Projects (Part III)

1. Dating young stars.

How do we know the ages of young stars? What dating mechanisms are there, and what are their uncertainties? Are the uncertainties mainly observational or theoretical? What problems exist, and how could they be resolved?

2. The universal initial mass function.

What is the relative fraction of formed stars as a function of mass (i.e., the IMF)? Does the IMF change with environment, and if, by how much? Does it change with time (redshift)? What are the proposed mechanisms for having a universal IMF? Is there a relation between the IMF and the clump mass function of interstellar clouds?

3. The role of turbulence in star-forming clouds.

What observational evidence is there for turbulence in interstellar clouds? What is the importance of turbulence for star formation? How does it affect the velocity and density distribution of star-forming clouds?

4. The structure of interstellar clouds.

What observed structures do interstellar clouds have? How well do approximations of e.g. constant, clumpy, and fractal structure work, and what implications do particular models have for radiative transfer, ionization regions, and star formation? How, and how well, can the structure be characterized?

5. Stellar multiplicity in star formation.

What is the fraction of stars formed in multiple system? Does the fraction depend on initial environmental conditions of the star forming cloud? Do the number of multiple systems change with stellar age?

6. Outflows and jets in star formation.

What is the observational evidence for outflows? What are the proposed physical mechanisms? How does the outflow influence the formation of a star in the early stages? How is disk accretion and jet formation connected?

7. Dust/Gas disk evolution.

How does the initially massive gaseous disk around a young star evolve in time? What processes govern its disappearance? What is the relation between gas and dust, and how does it evolve?

8. Physics of debris disks.

What is the principal difference between a protoplanetary disk and a debris disk? What is the gas/dust relation in debris disks? How do debris disks evolve, and what is the significance of gas in debris disk? What role has the radiation from the star in the disk evolution? How does a planetary mass object influence the disk structure?

9. Planet formation scenarios.

How do planets form, according to current theories? Do they successfully predict the planets of our solar system as well as the observed population of extra-solar planets? Are there observational tests able to distinguish between scenarios? What are the planet formation time-scales, and are they compatible with observed time-scales of disk evolution?