

FUTURE PROSPECTS FOR GALACTIC ISM

MOLECULES

- How does H₂ form? How efficient is H₂ formation in different environments (i.e., on different grain surfaces), and what is the energy partition of newly formed H₂ ?
- Where is the oxygen (continues to be an issue even in the age of Herschel) ?

DUST

- What are the spectroscopic and physical differences between dust formed by 'high-mass' and low-mass' stars (eg., SN vs AGB) ? And between dust injected by stars vs. dust formed by accretion in the ISM ?
- What is the actual dependence of the dust-to-gas ratio on the local metallicity ?

FILAMENTS

- What theoretical modeling is needed to understand the filamentary structures seen in Herschel images? What is the connection between these structures and those seen in HI?
- How much mass could be hidden in transient filaments of CO-dark H₂ gas in the outer Galaxy?

STAR FORMATION / TURBULENCE

- What is the impact of star formation on the ISM? And, in what form is this impact, i.e., how much is through radiation and how much is through shocks?
- What, in spite of so many violent storms, preserves the self-similar structure of the ISM and the coupling between scales from AU's to kpc's? Gravity? Magnetic fields?
- What powers the turbulent motions on scales of (a) galaxy thickness (b) diffuse clouds (c) self-gravitating clouds?

COSMIC RAYS/MAGNETIC FIELDS

- How much variation is there in the cosmic-ray ionization rate in diffuse clouds and between diffuse/dense clouds ? And are these variations real ?
- What is the primary source of low-energy (MeV-GeV) cosmic rays?
- How do the stellar radiation, magnetic fields and cosmic rays cooperate in shaping the ISM ?