

Mike Jura's work on AGB Stars

History

Models of envelopes

Surveys

Individual objects

Properties of circumstellar dust

Links to planet formation and solar system

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Michael Jura

Mike and I never worked at the same institution -- we met primarily at meetings -- so I did not get to know Mike as well as I would have liked to. But I knew Mike well enough to know that he was a superb scientist, and a fine human being.

I greatly admired him as a scientist. He wrote elegant scientific papers, on topics ranging from light scattering by interstellar dust to formation of molecular hydrogen. I worked on some of the same problems, and always wished that I could somehow write papers with the clarity that he achieved, seemingly effortlessly. Scientific discussions with him were similar -- he knew how to zoom in on the central issues. You can't be as fine a scientist as he was without having a passion for it, as well as a gift.

Mike was humane and generous, and possessed a fine sense of humor. A conversation with him was always a joy. He will be missed by friends and colleagues in many places.

-- Bruce Draine
September 9 2016

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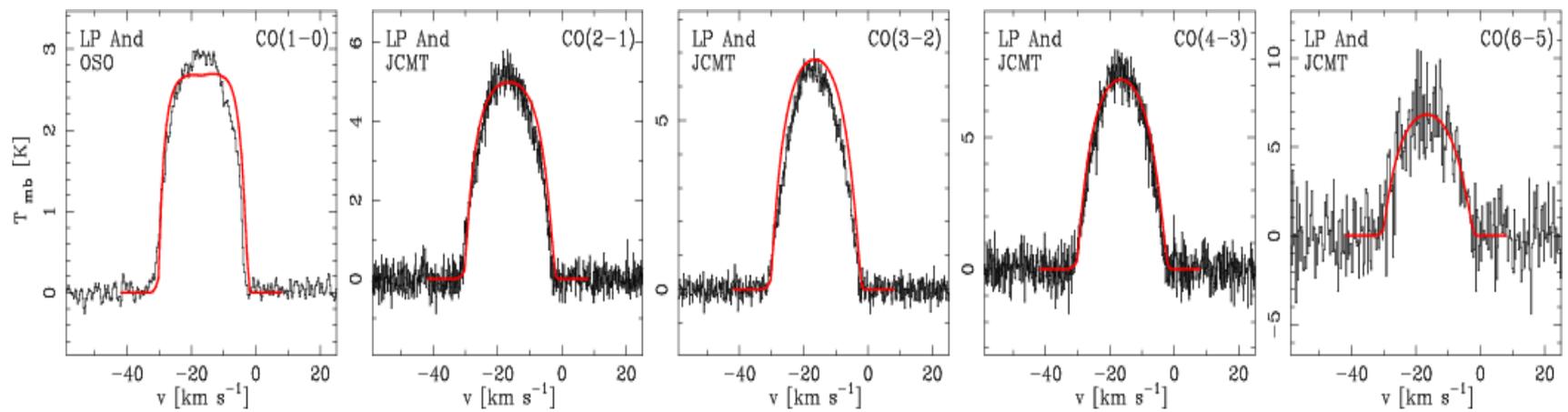
Loreta 1936: dust formed by R CrB

Hoyle and Wickramasinghe 1952: dust formation in cool envelopes

IR surveys late 60s on: IRC+10216 the second-brightest 2 micron source in the sky

Detection of CO emission, Solomon et al. 1974

Detection of CO emission from NGC 7027, Marionni et al 1975
- connection between mass loss, planetary nebulae and white dwarfs



Ramstedt et al 2010

Mass loss and evolution

Galactic evolution

Dust production

Mass loss mechanisms: binaries, pulsations,
radiation pressure?

Connection with solar system and planet formation

Jura and Morris 1981

Morris and Jura 1983a, b

Models for circumstellar envelope around Betelgeuse:
Interstellar UV critical in determining properties of outer
regions. K/C ratio and CNO processing

Molecular self-shielding and molecular hydrogen abundance

UV limits envelope sizes

Distance to NML Cyg and its luminosity: Cyg OB2 association
Is ionizing the envelope

Surveys and statistics, papers with Susan Kleinman:

-number density of carbon stars constant with Galactic radius, number density of oxygen-rich stars drops

-short-period Miras are produced by lower-mass progenitors

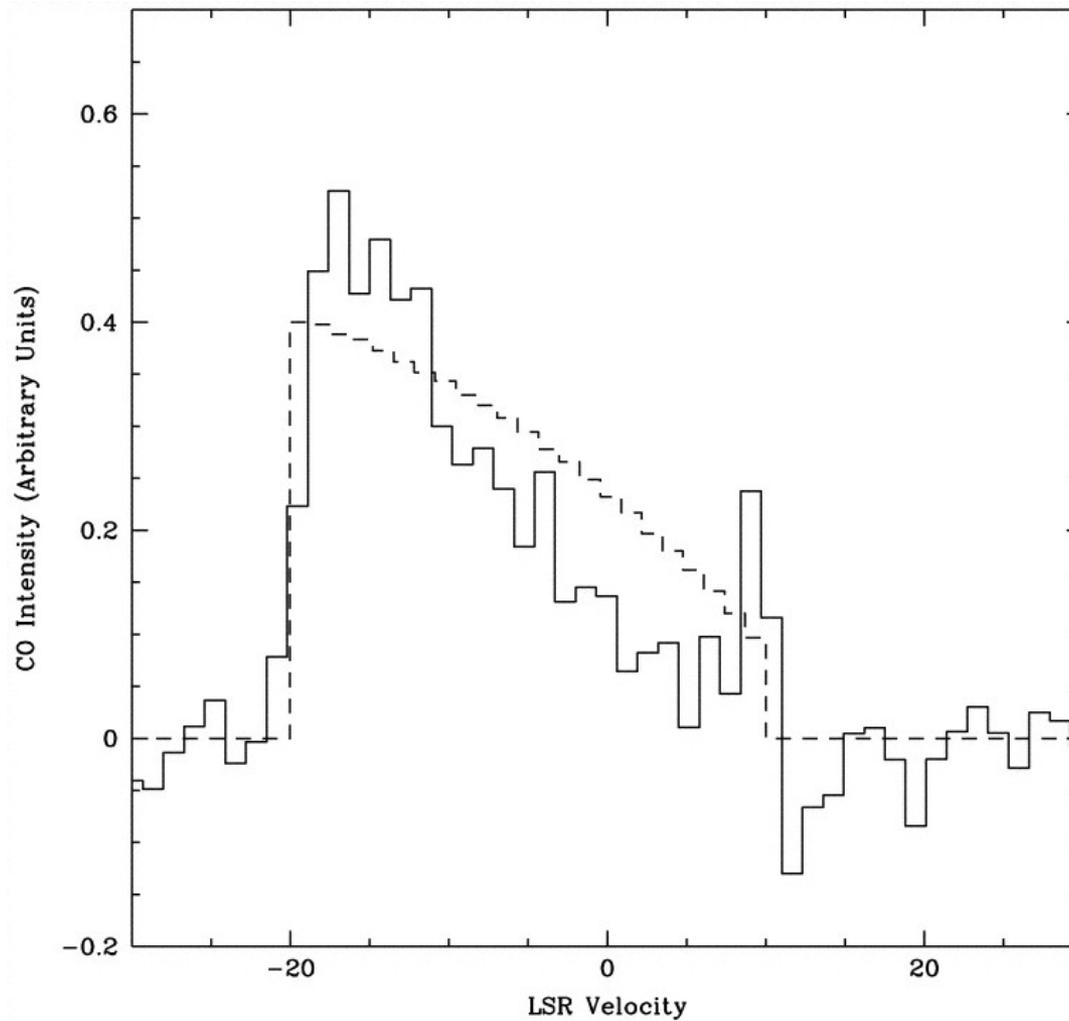
-AGB stars form most of the interstellar dust and this accounts for the mixed composition: about half and half silicates and carbonaceous

Use of extent of molecular envelopes to measure dust properties: grain size distribution etc

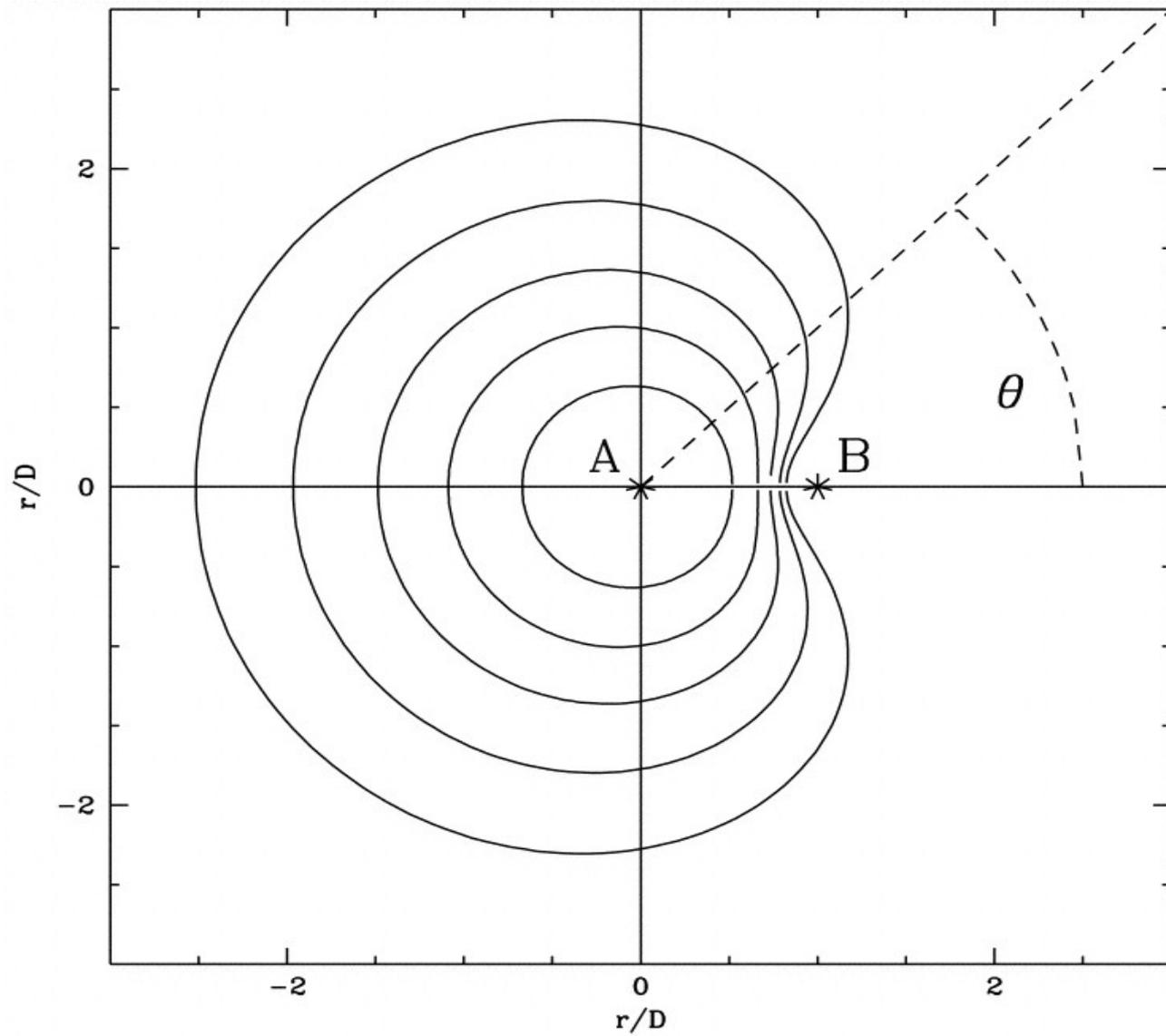
Exploration of circumstellar dust around first-ascent red giants: mass loss or the vaporization of small bodies: KBOs, asteroids, comets?

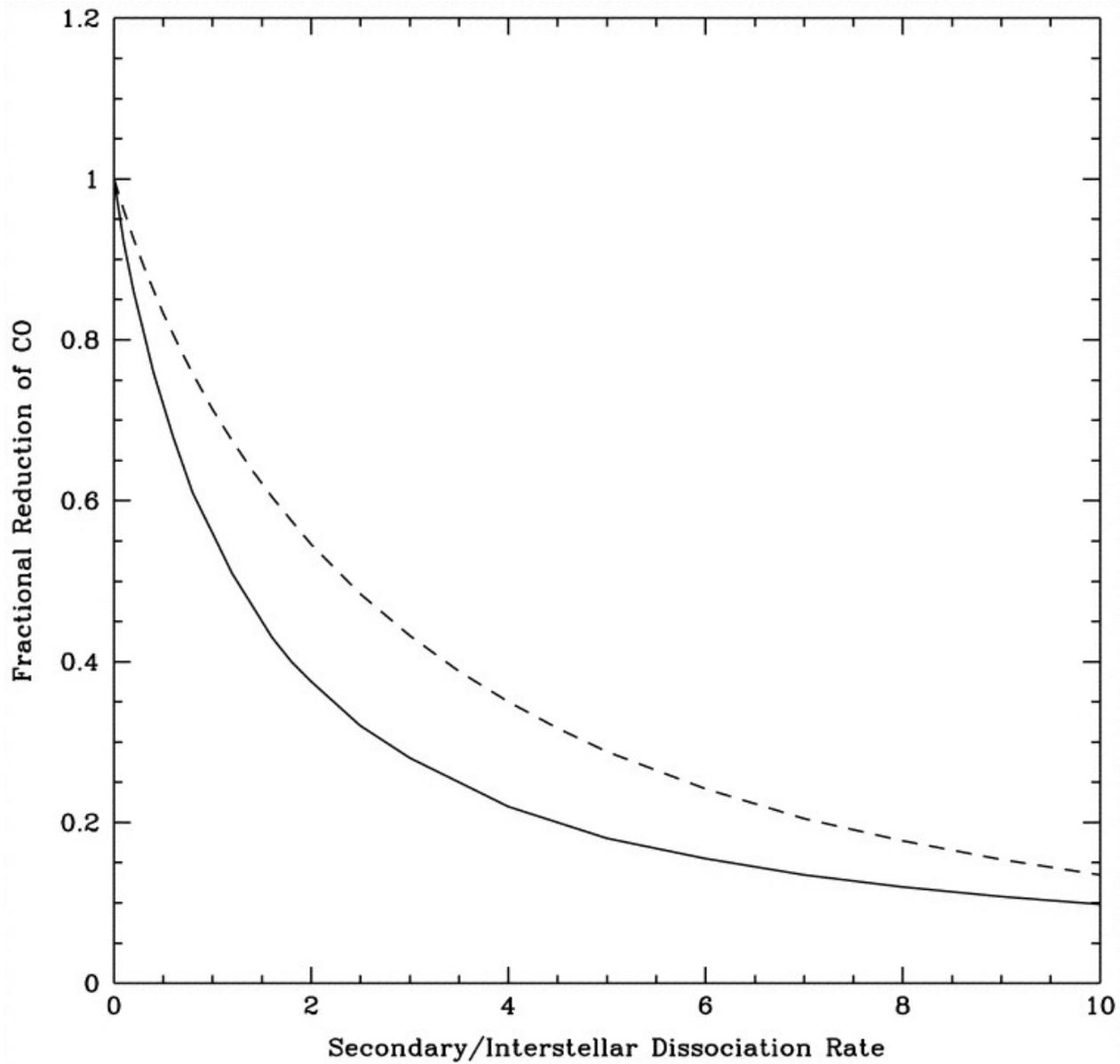
Extent of HCN envelopes: nitrogen abundances in red supergiants

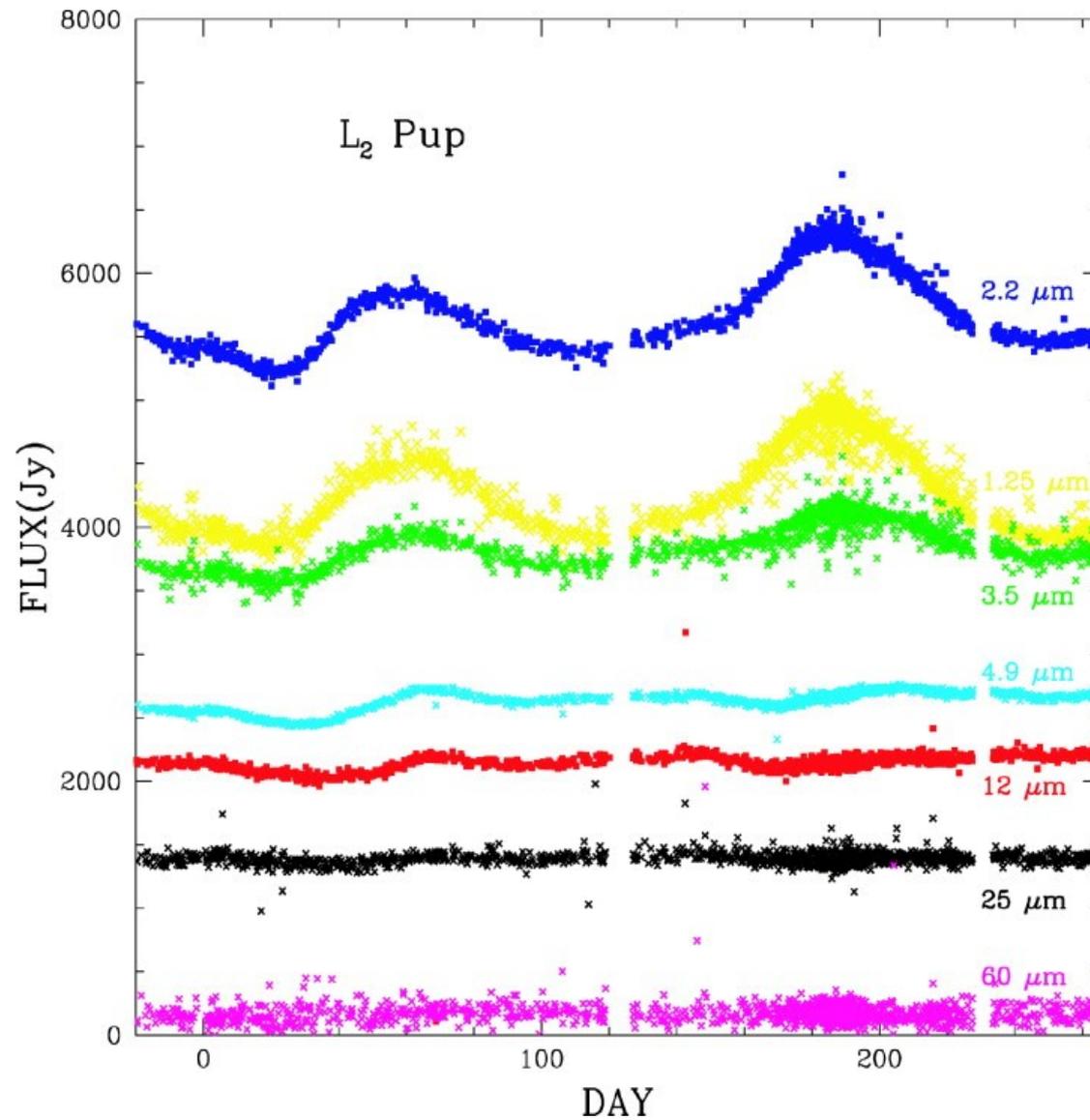
HD188037



Jura et al. 1997, ApJ 485, 341







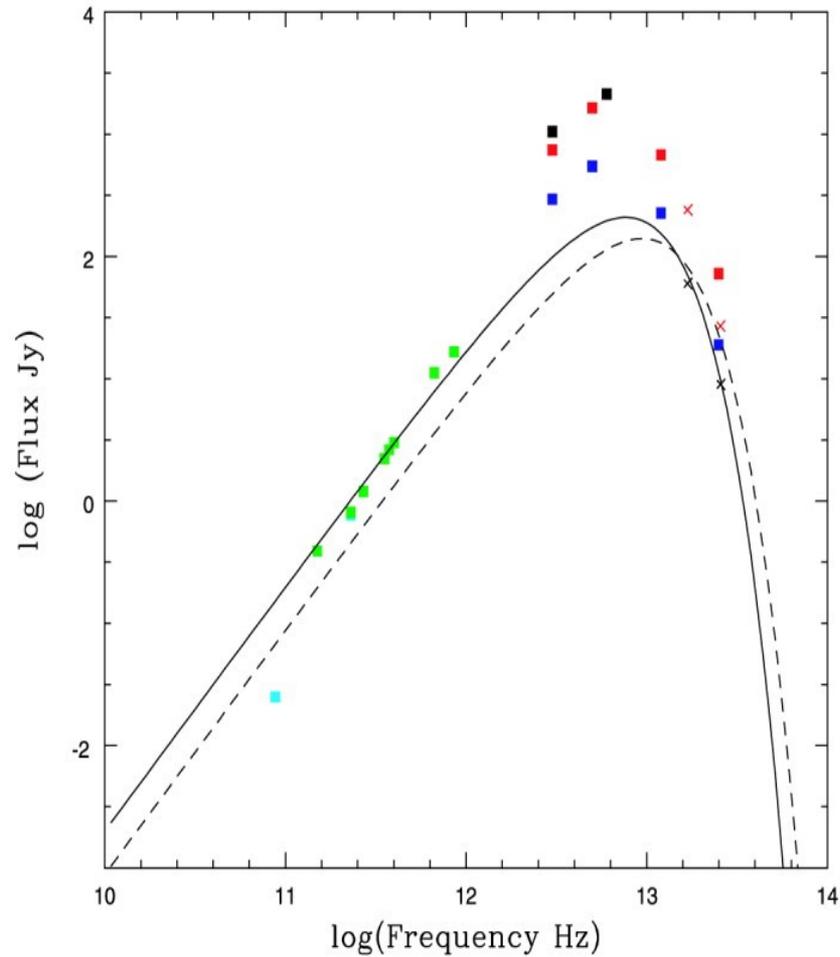
Jura et al. 2002 ApJ 569, 964

Importance of mm-wave observations:

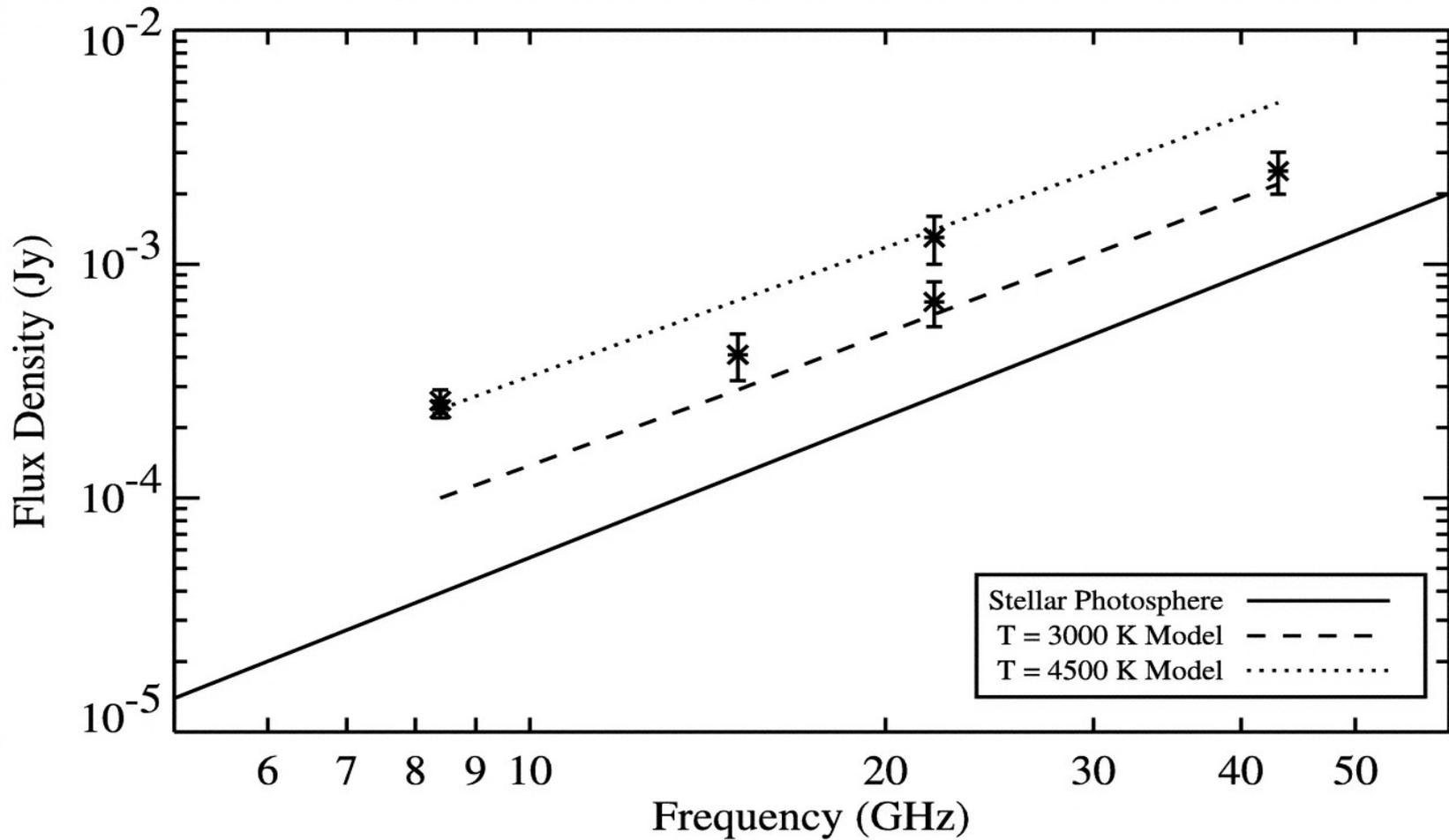
-dust shell transparent

-large grains

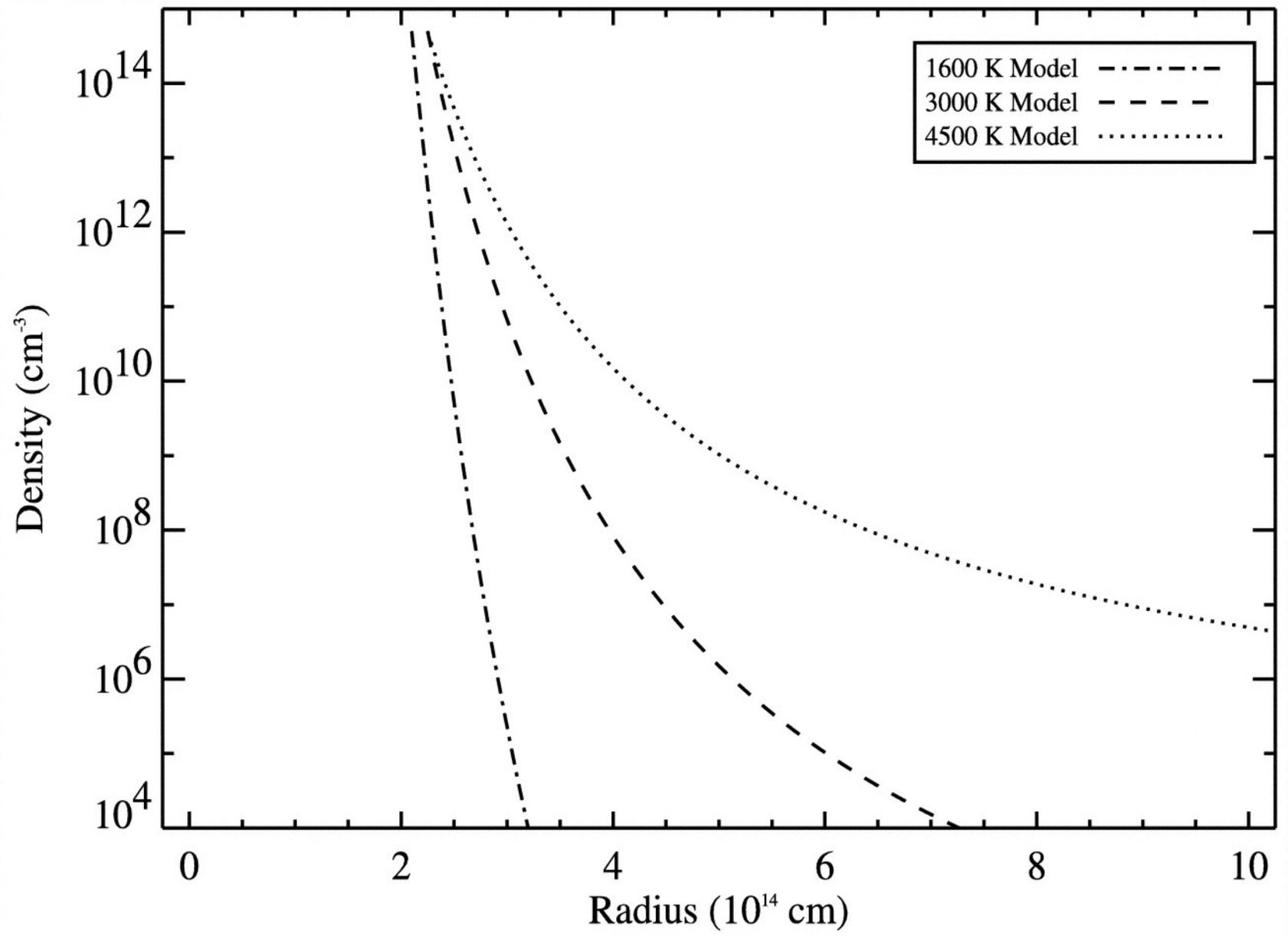
OH231.8+4.2, VY C Ma, AFGL 2688

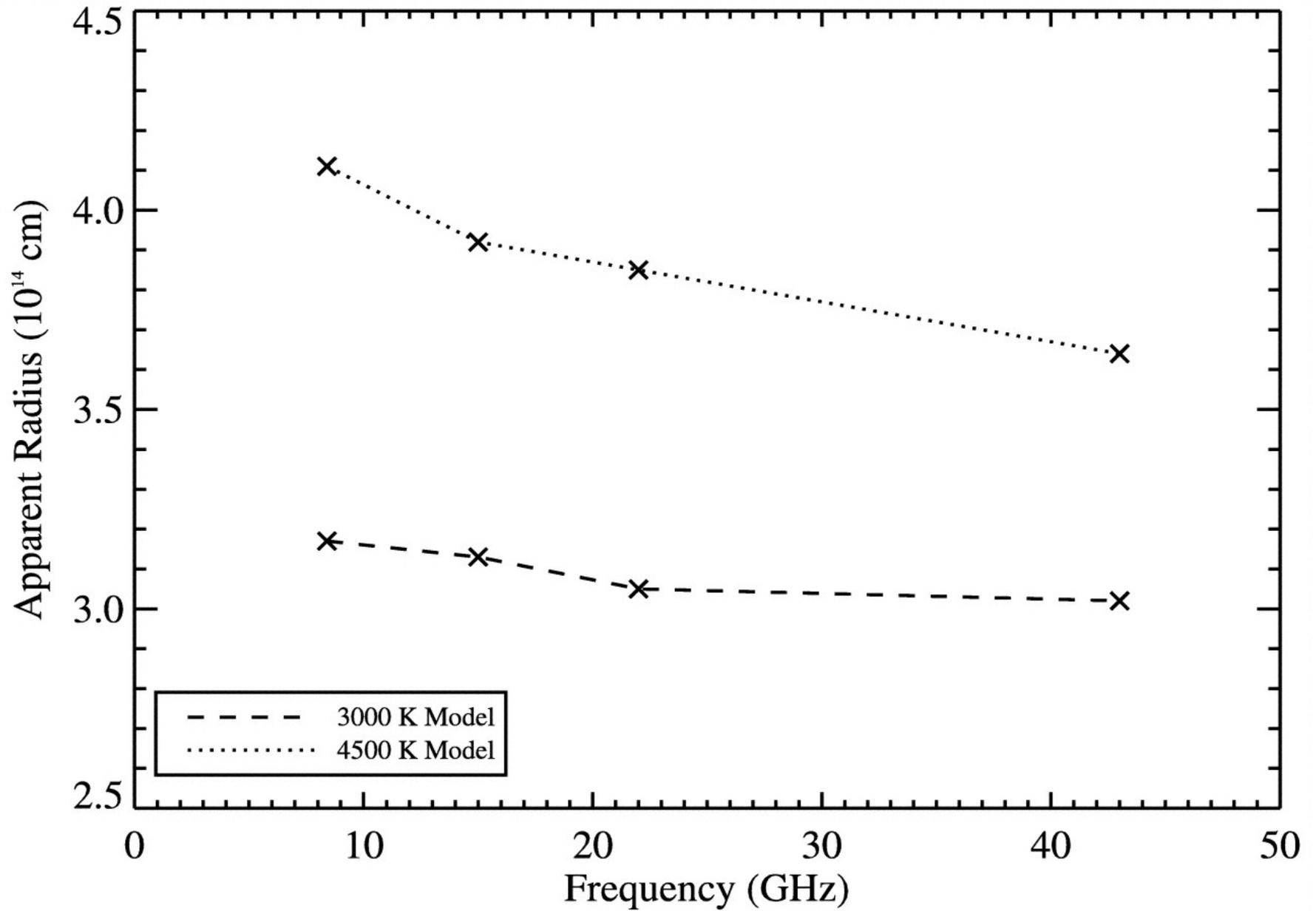


Jura et al. 2002 ApJ 574, 963

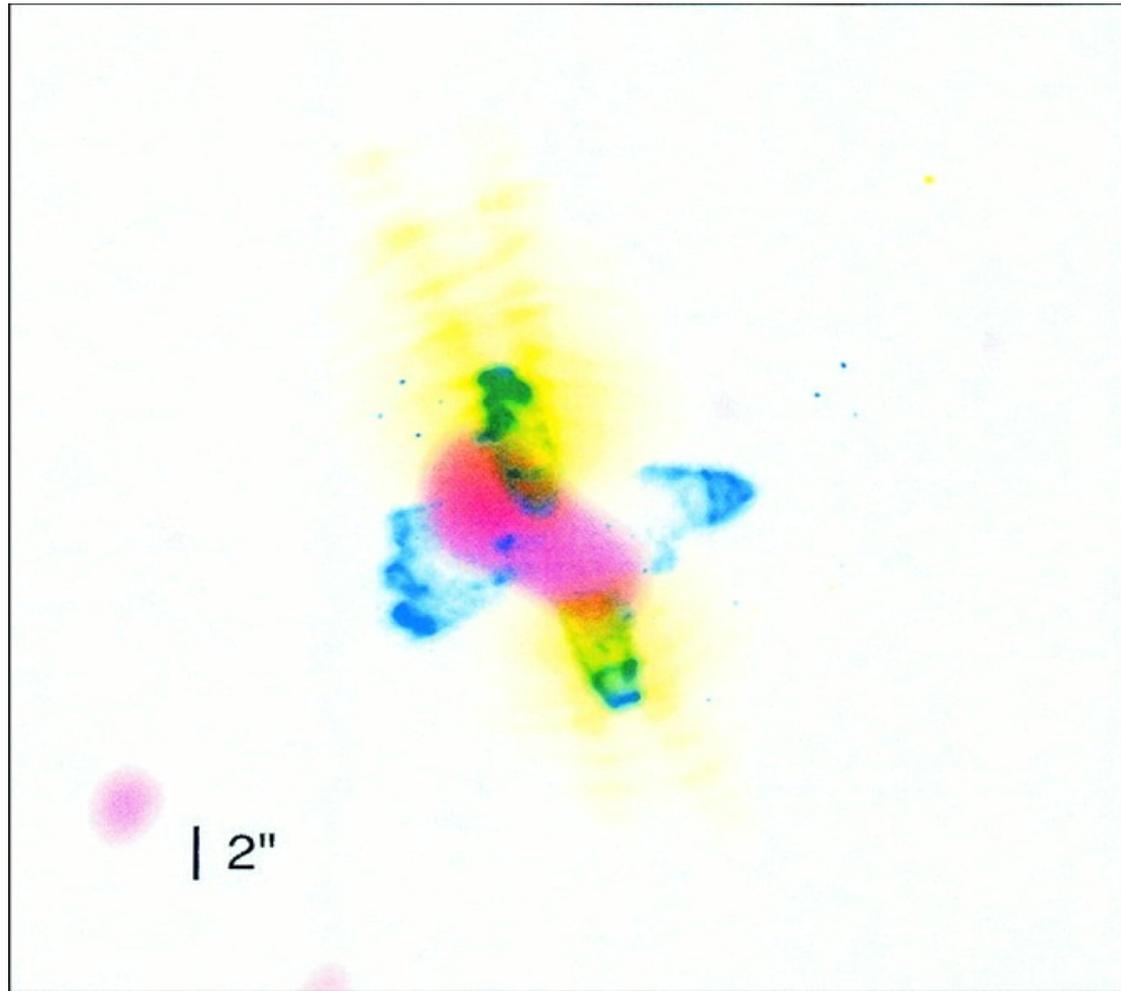


Lipscey et al. 2005, ApJ 626, 439

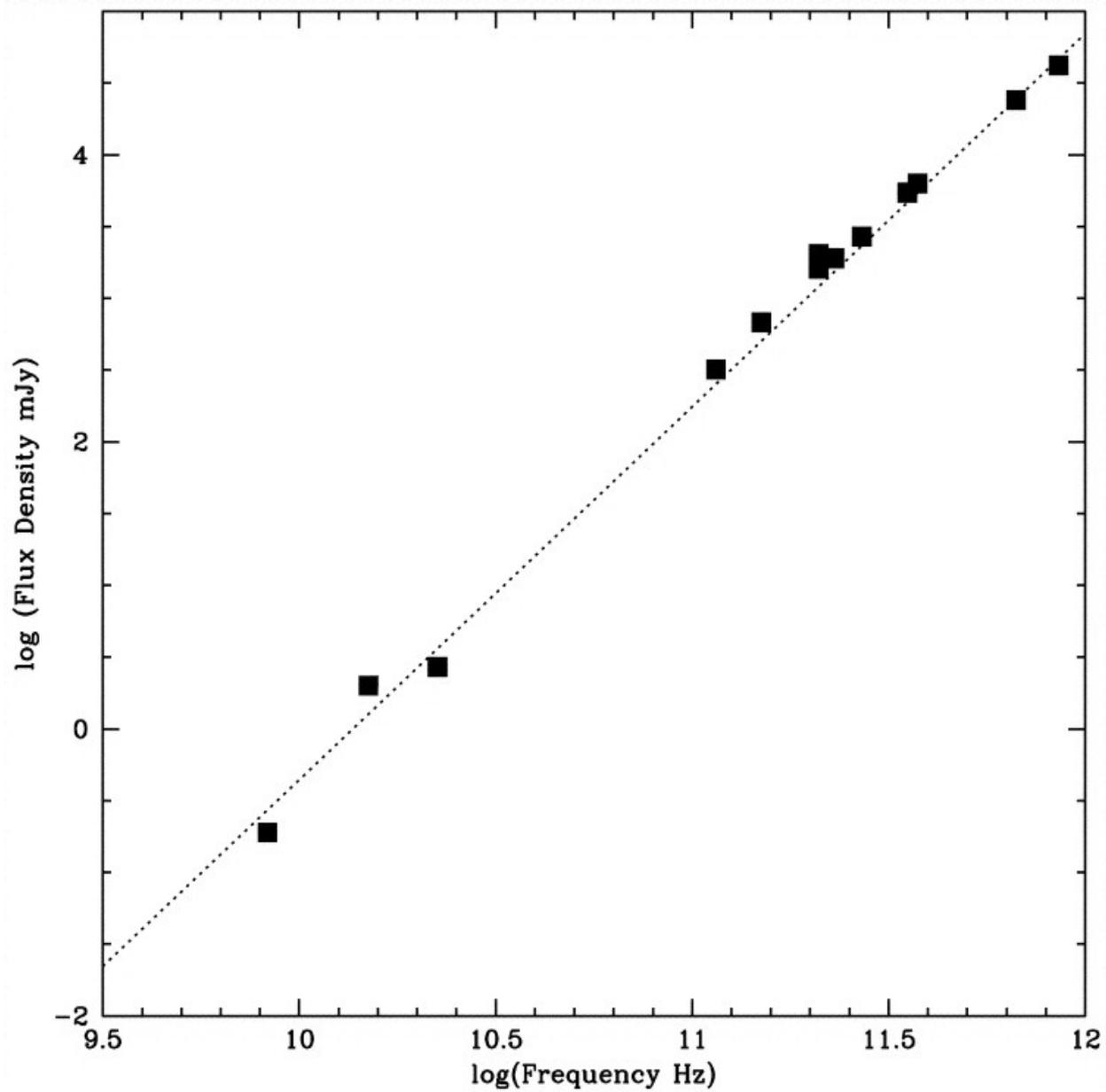


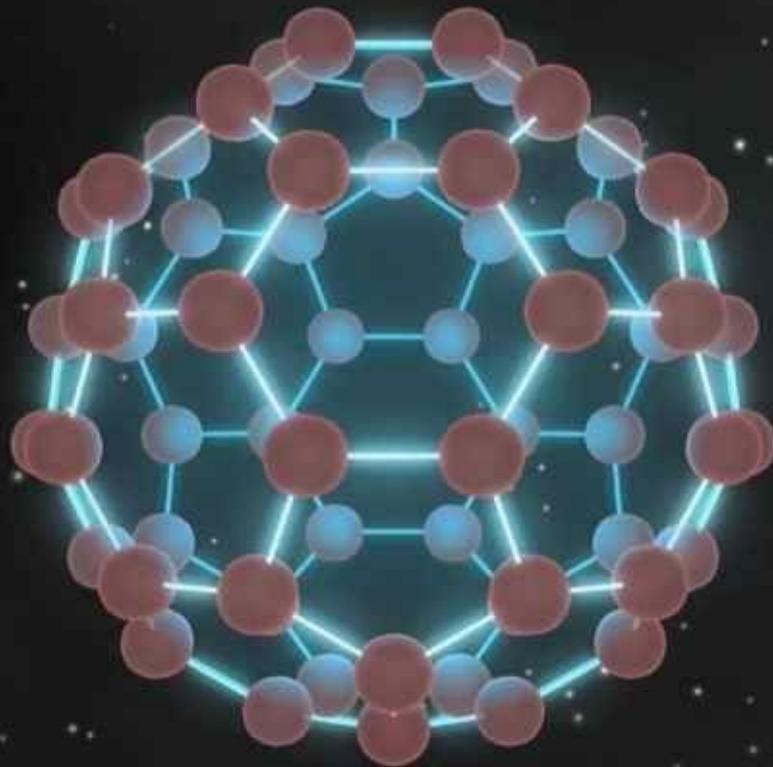


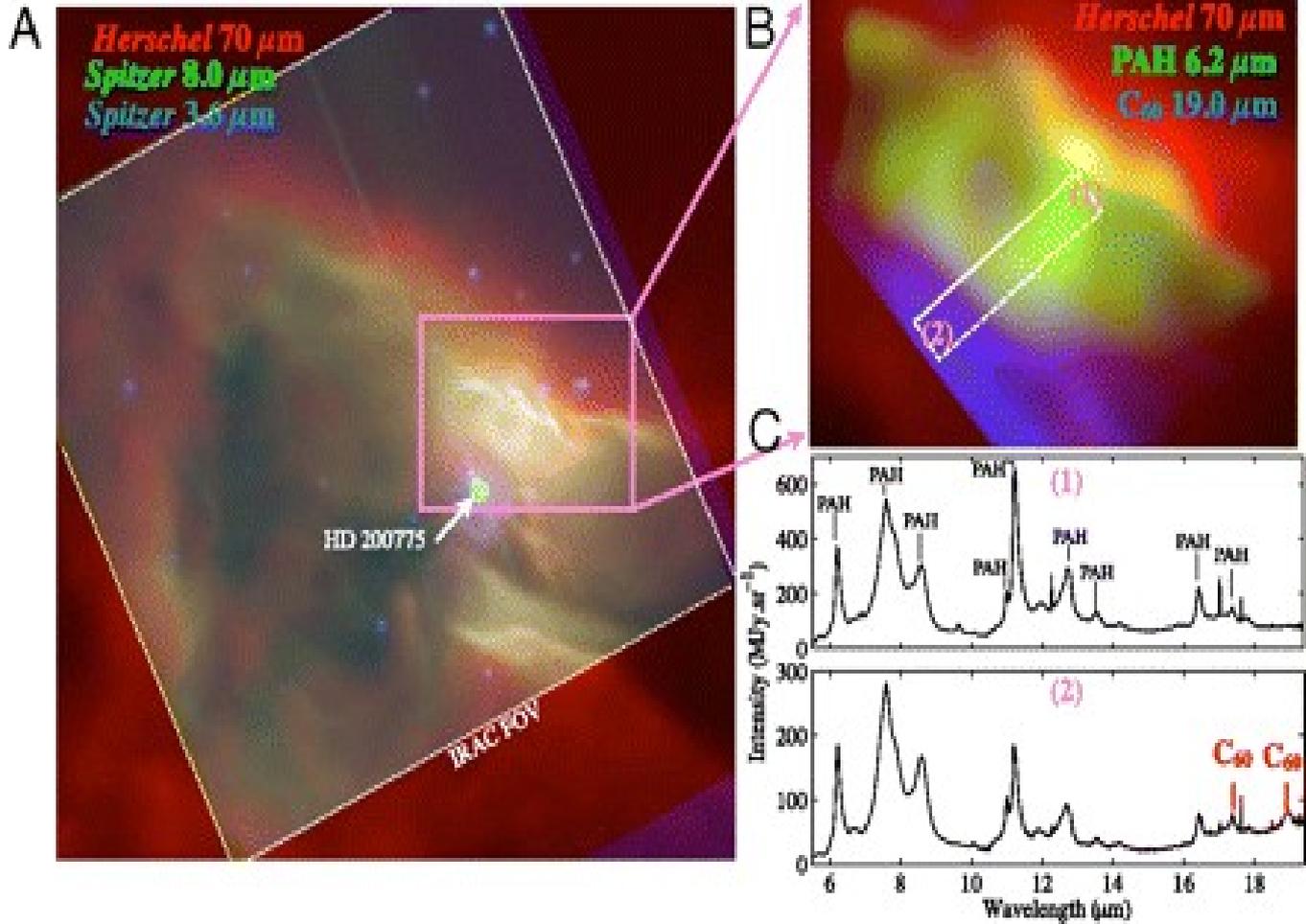
AFGL 2688



Jura et al. 2000, ApJ 528, L105







Mike: elegance and clarity

homed in on interesting questions that were
Overlooked

Fine, almost literary analysis of divergent
Conclusions

Physics and astrophysics at his fingertips:
stellar structure, atmospheres, dust properties,
molecule formation -----

Very little time for foolishness but always
humane and kind

