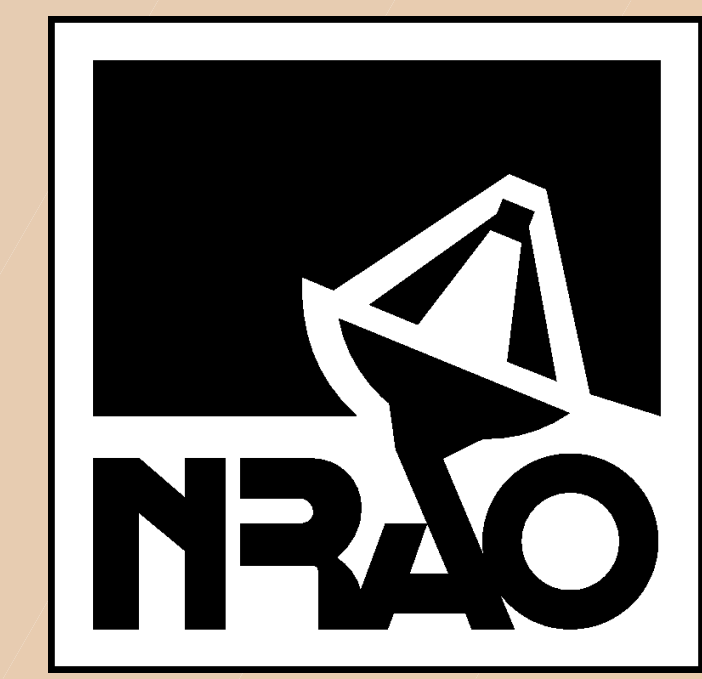


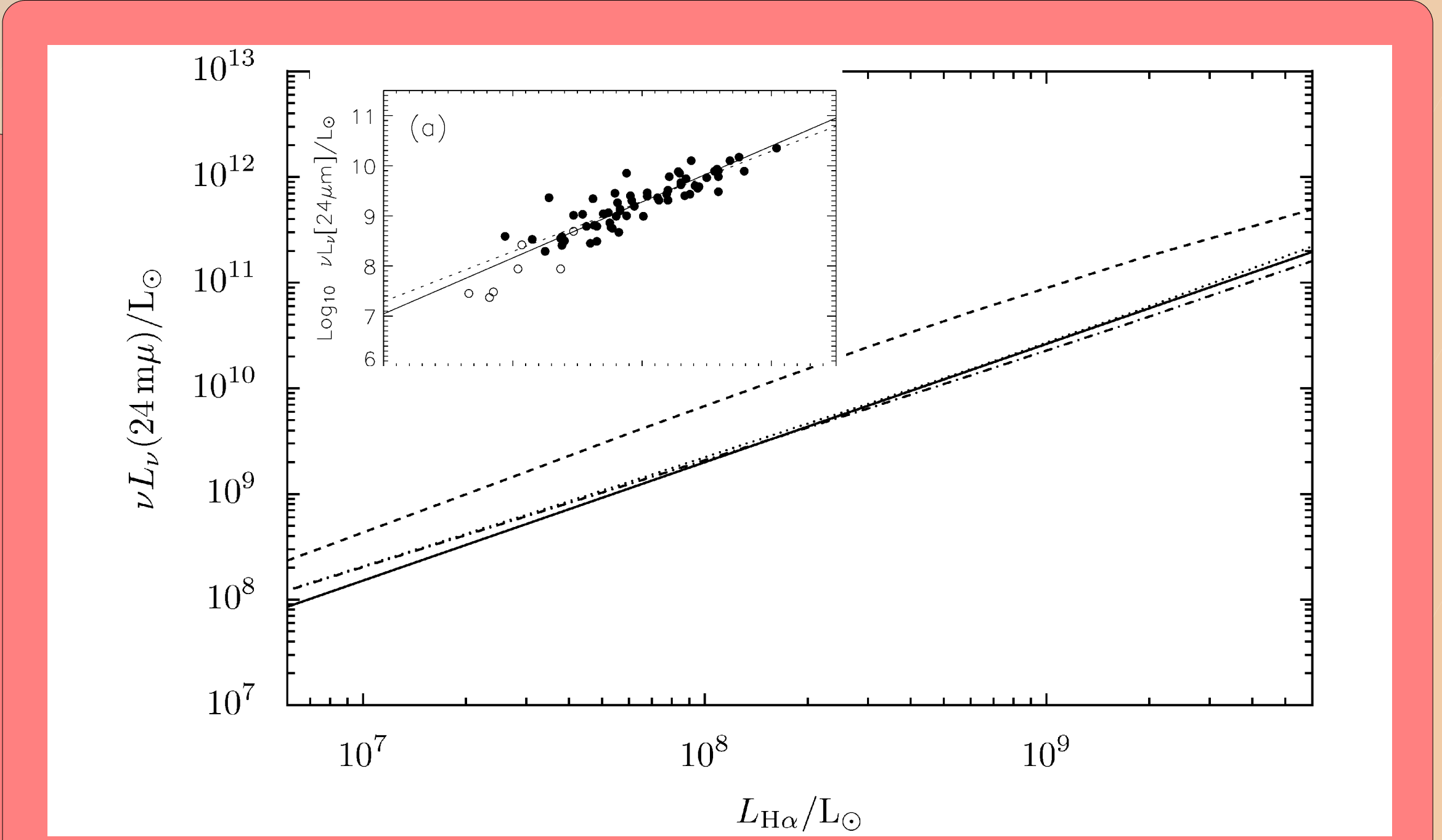
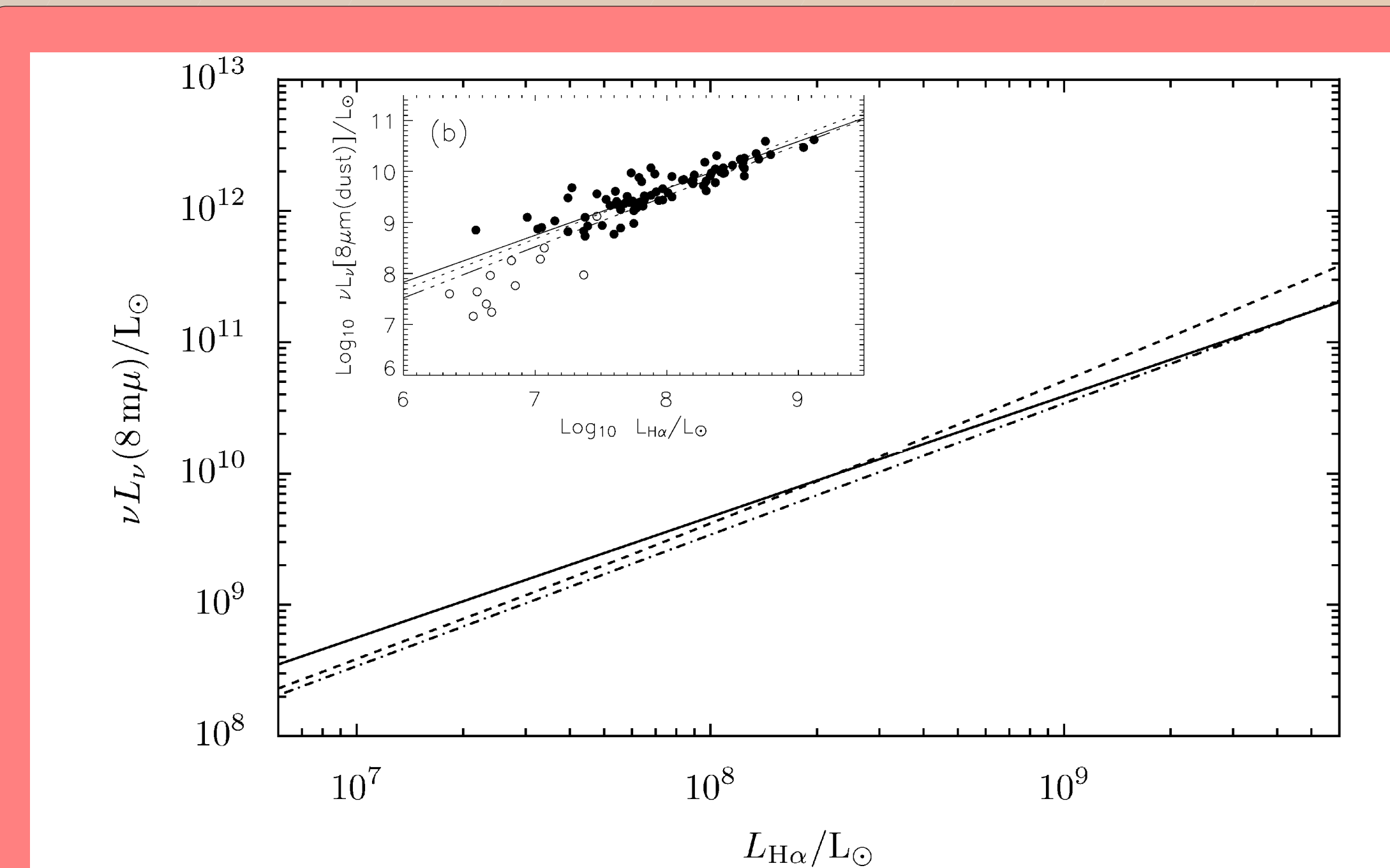
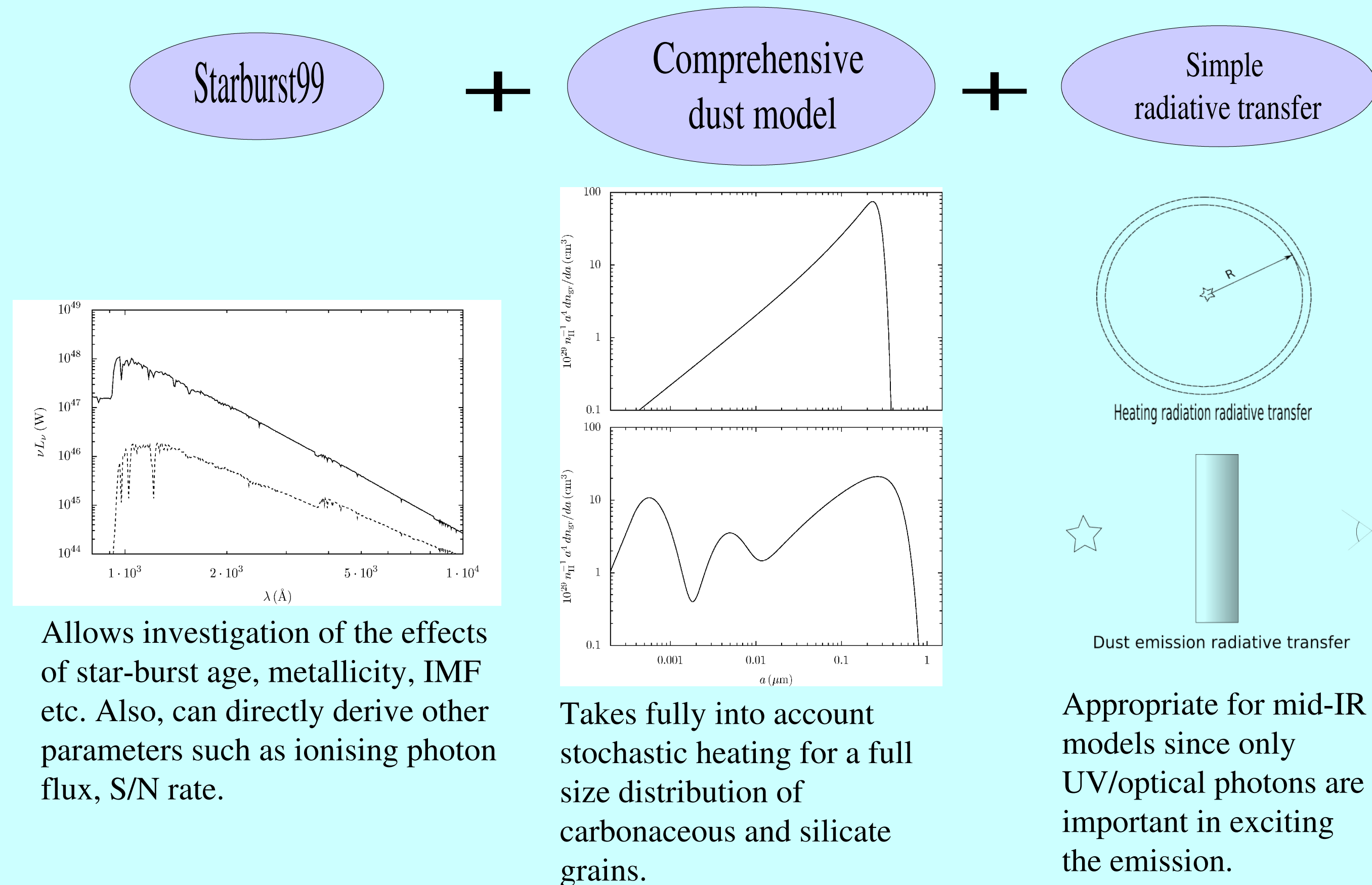
Toward a Quantitative Interpretation of Mid-IR Spectra of Galaxies

B. Nikolic (NRAO),

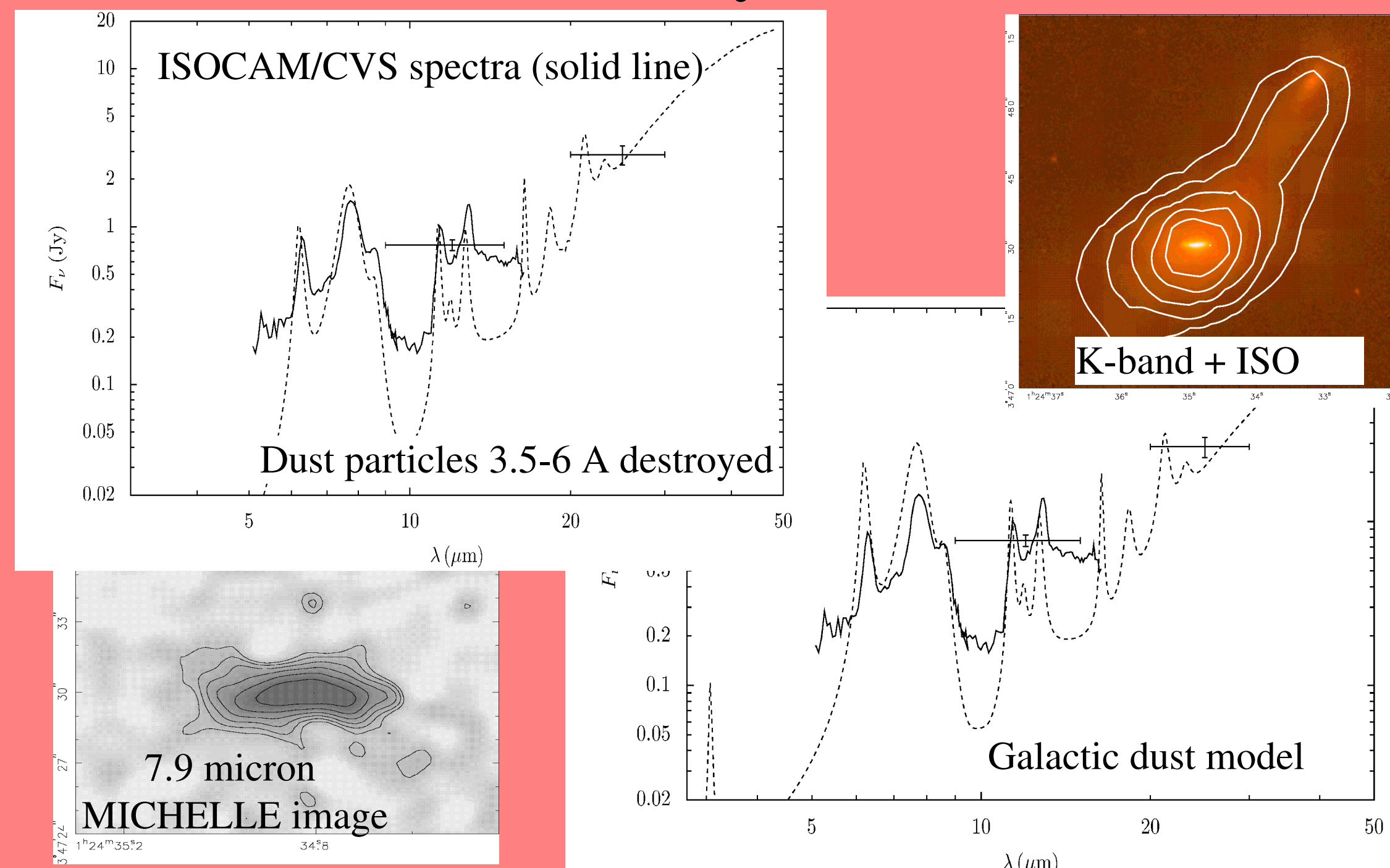
P. Alexander (Cambridge), M. Clemens (Padova), D. Ford (Cambridge), G. Cotter (Oxford), M.S. Longair (Cambridge)



The Method

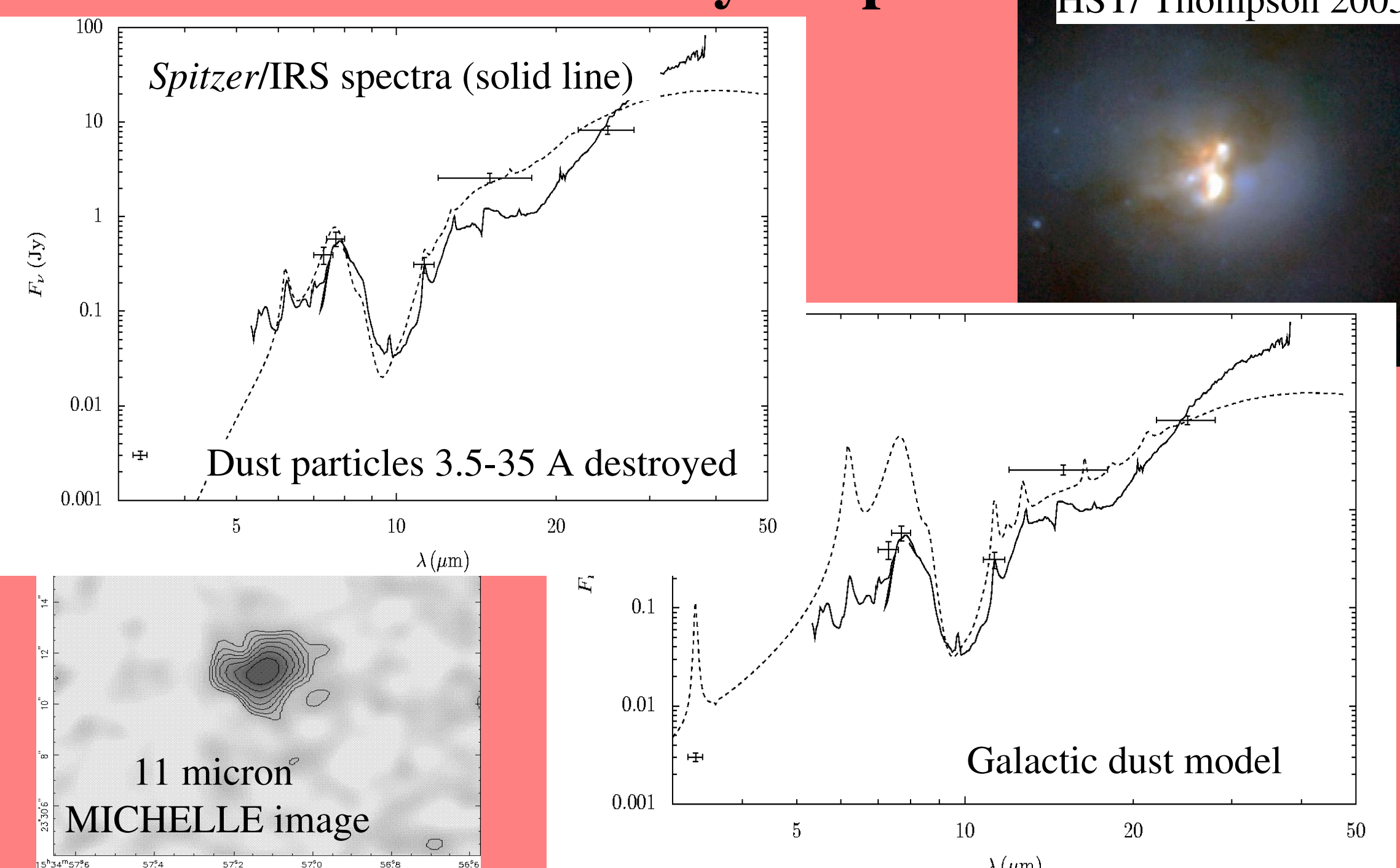


Case study: NGC 520



The model spectra were produced for a star-formation rate of 7 solar masses per year (derived from Brackett line measurements, radio measurements), and with dust shell radius of 400pc (derived from mid-IR imaging above).

Case study: Arp 220



Assumed star formation rate 120 solar masses per year (Brackett lines, FIR luminosity), dust shell radius 150pc (mid-IR imaging), column density $1.2 \times 10^{22} \text{ cm}^{-2}$ (Brackett lines).

Summary

- We have constructed a framework for modelling mid-IR emission of galaxies which makes it possible to directly relate observed spectra or photometry to the star-formation rate, dust properties and/or geometry.
- The models naturally reproduce the observed correlation between mid-IR luminosity and star-formation rate. They indicate that dust responsible for the bulk of mid-IR emission is not directly associated with the young stars.
- More detailed studies of a moderate (NGC 520) and very intense (Arp 220) starburst are presented. Although there is a rough agreement between models and observations, it is clear properties of the dust must be changing.
- The effect of destruction of the smallest grains is investigated and shown to be consistent with the observations. A reasonable fit to the observed spectrum of Arp 220 requires destruction of a large fraction of the small grain population.

Acknowledgements & References

- We have made use of observations obtained from the *ISO* and *Spitzer* archives. Additionally, the results here are based on observations with UKIRT/MICHELLE.
- We would also like to thank Dr. Kotilainen for providing us with the K-band image of NGC 520.
- The dust model is based on the work of Draine, Li and Weingartner (published in a series of three articles in ApJ in 2001). The Starburst99 stellar population synthesis models are described by Leitherer et al, 1999, ApJS.
- The mid-IR/SFR correlations are from Wu et al, 2005, ApJ.

