Dust production in the LMC
An advertisement for SAGE

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& the SAGE team

Why the LMC?

- Entire galaxy
- Individual stars
- Known distance
- Metallicity effects
  - Dust production
  - Physical conditions that affect dust evolution

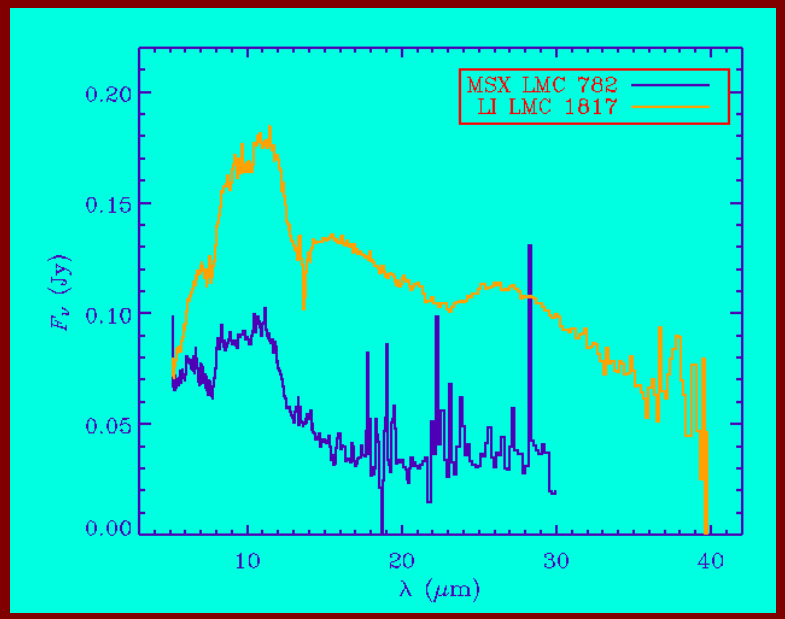
Spitzer & the LMC

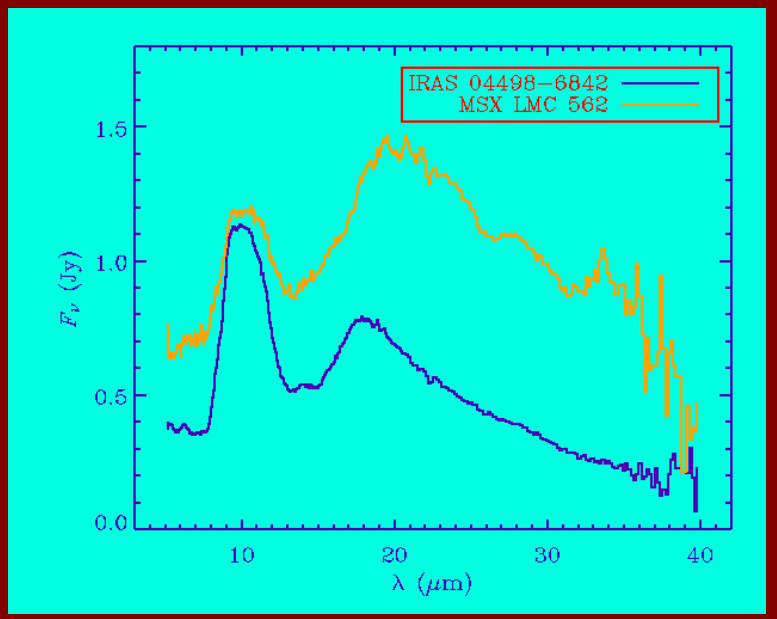
- SAGE *Meixner et al. 2006*
  - PI: M. Meixner
  - Legacy GO-2
  - IRAC & MIPS survey, correlated with 2MASS
  - Point source catalog now available via Gator @ IPAC
- Other Spitzer projects: IRS

  Zijlstra et al. 2006; Buchanan et al. 2006 …

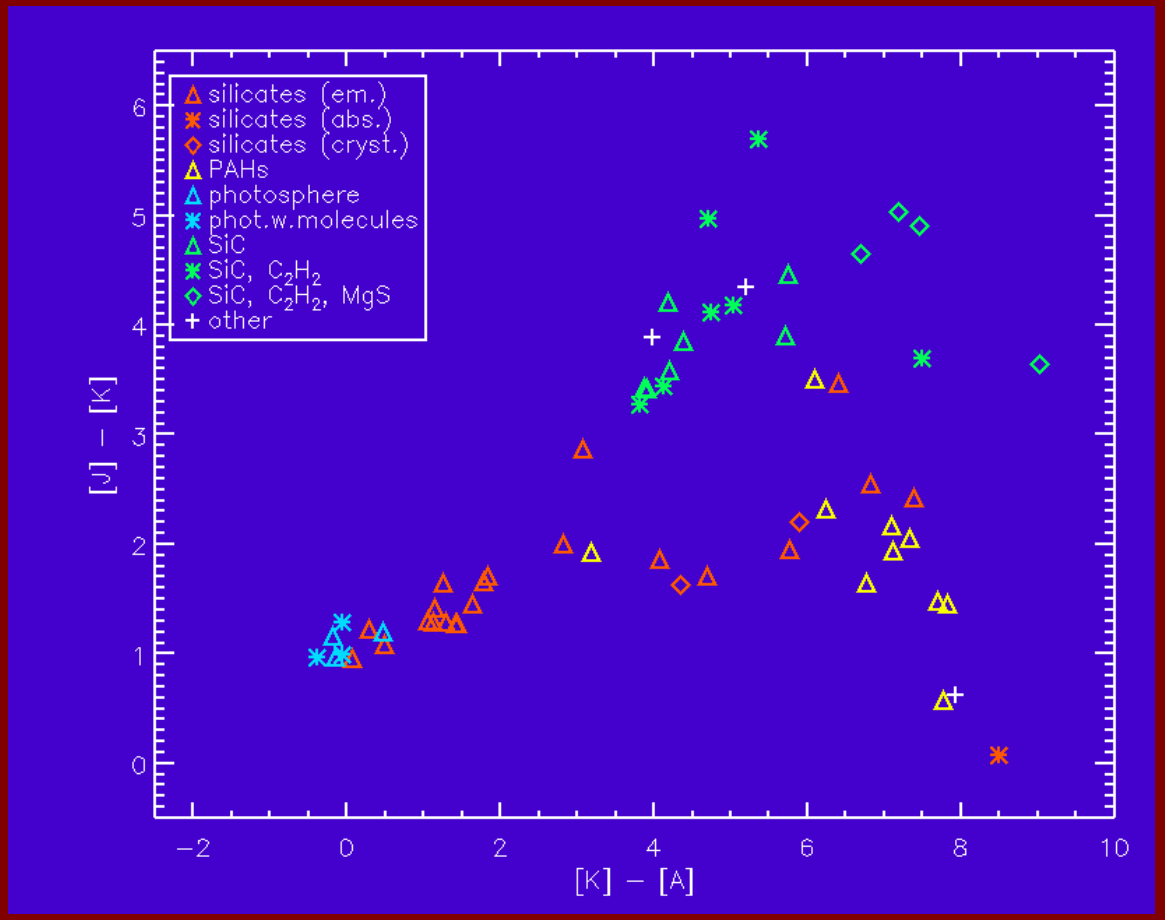
Results from IRS studies

C-rich vs O-rich environments





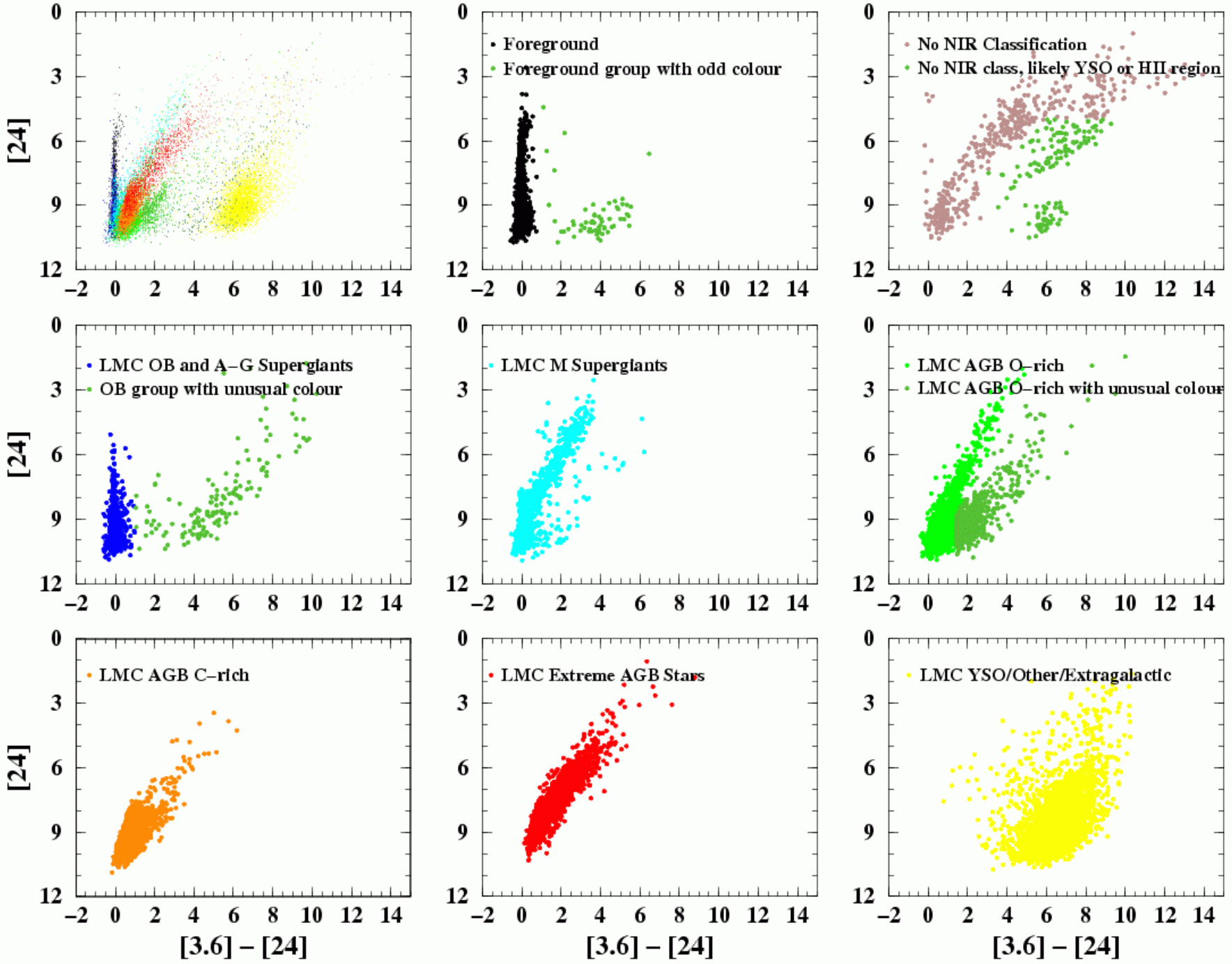
Markwick-Kemper et al. in prep.



Markwick-Kemper et al. in prep.

In the LMC, extreme AGB stars are carbon-rich

J-K > 3


Foreground
Foreground group with odd colour
No NIR Classification
No NIR class, likely YSO or HII region
LMC OB and A–G Supergiants
OB group with unusual colour
LMC M Supergiants
LMC AGB O–rich
LMC AGB O–rich with unusual colour
LMC AGB C–rich
LMC Extreme AGB Stars
LMC YSO/Other/Extragalactic
[24]
[3.6] – [24]

Source counts

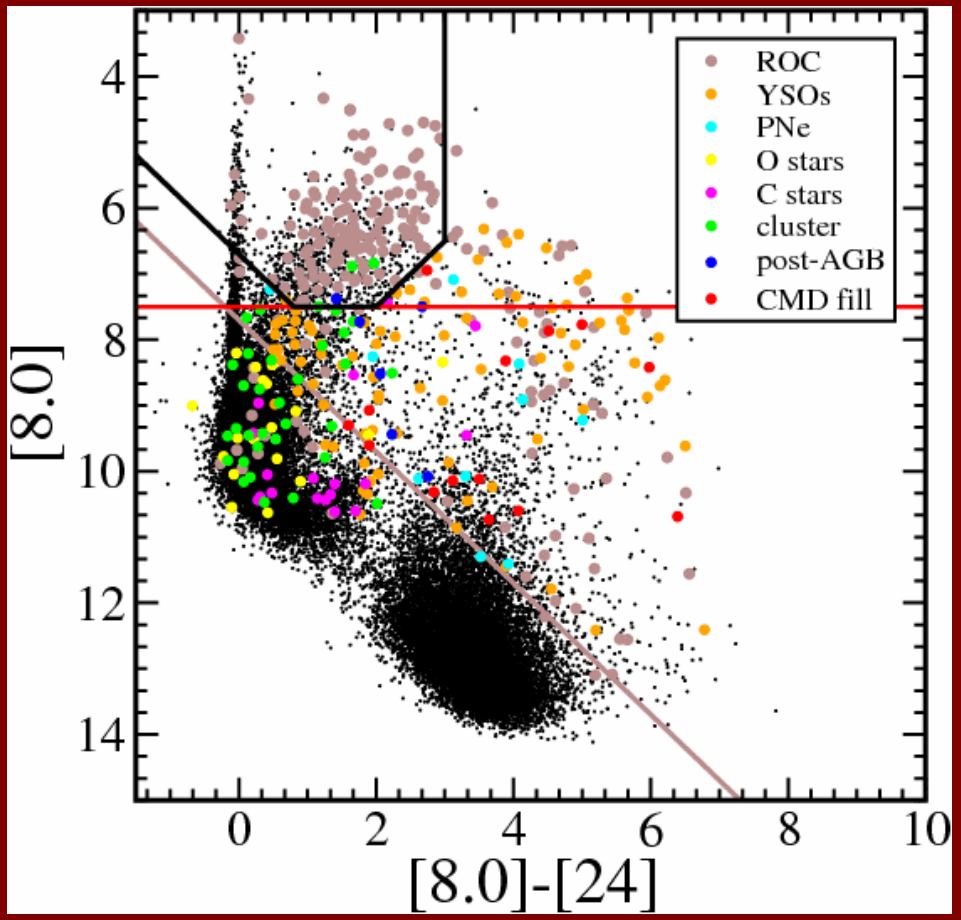
Total number of stars in SAGE: 4 million

Total number with J and [3.6]: ~820,000

- C-rich AGB stars: 1%
- Extreme AGB stars: 0.1%
- O-rich AGB stars: 2%
- Supergiants: 0.1%
- Faint O-rich AGB stars with dM/dt: 4%

Blum et al. 2006

Sampling C-M-space



SAGE-Spec

Injection of dust into the ISM

- Will be characterized using SAGE and spectroscopic information (SAGE-Spec)
- On a galaxy-wide scale:
  - Dust mass, injection rate
  - Composition, properties

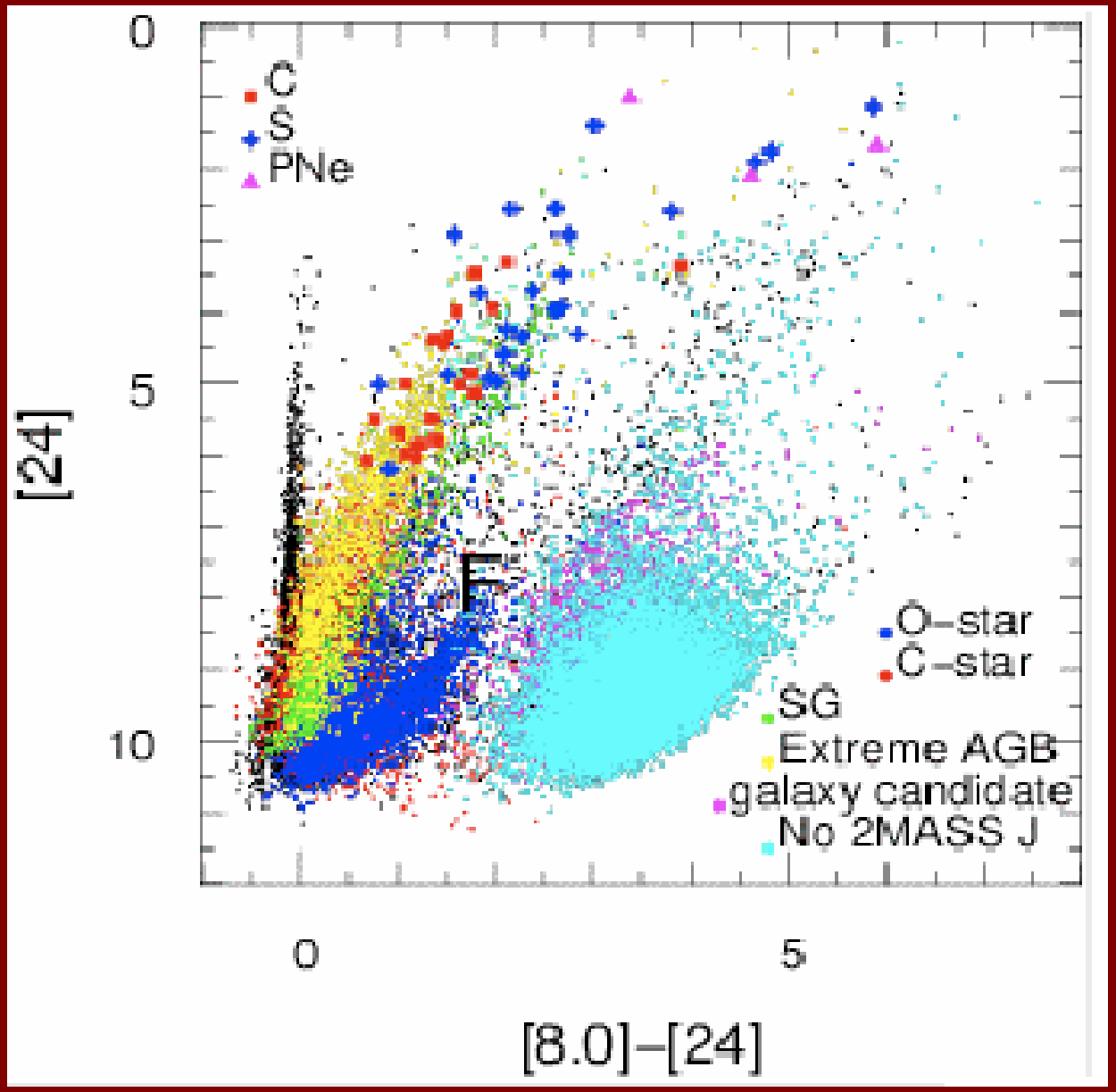
What next?

- Dust evolution in the ISM
  - Destruction rate, residence time
  - Interstellar dust properties, extinction curve
  - Interaction with radiation field, CR
- Comparison with other galaxies, Z
  - SMC
  - Milky Way

The SAGE team

http://sage.stsci.edu/


SAGE
LMC


0
5
10
[24]
C
S
PNe
O–star
C–star
SG
Extreme AGB
galaxy candidate
No 2MASS J
0
5
[8.0]–[24]

SAGE LMC