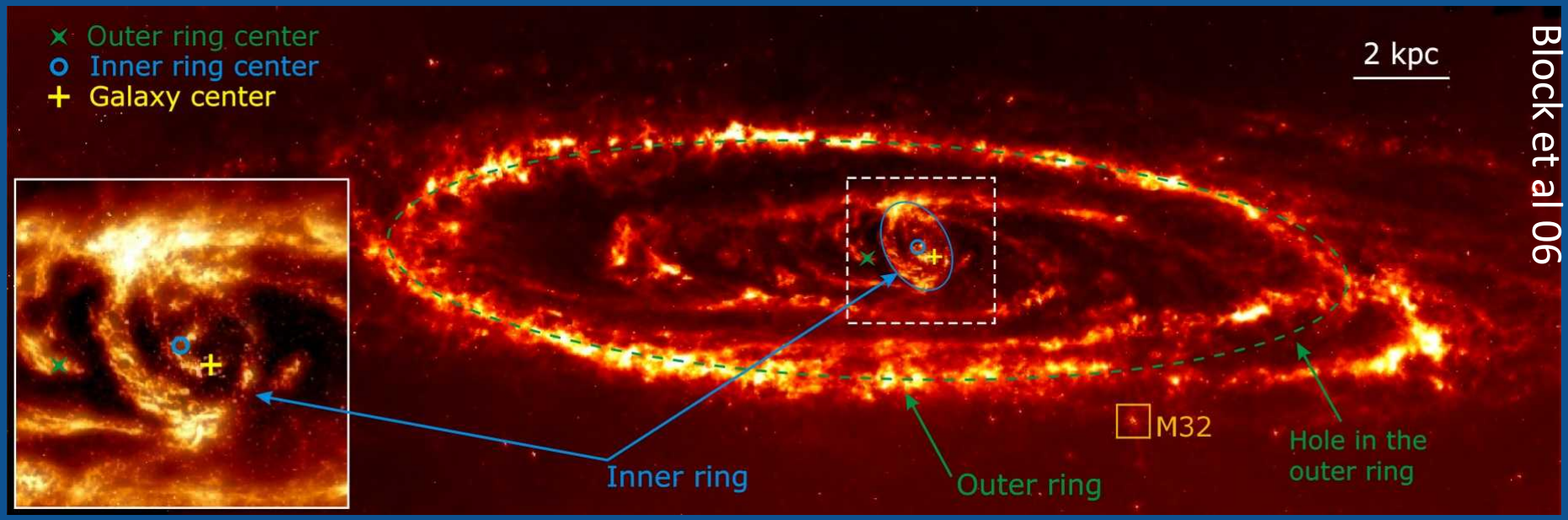
M31 in the mid-infrared

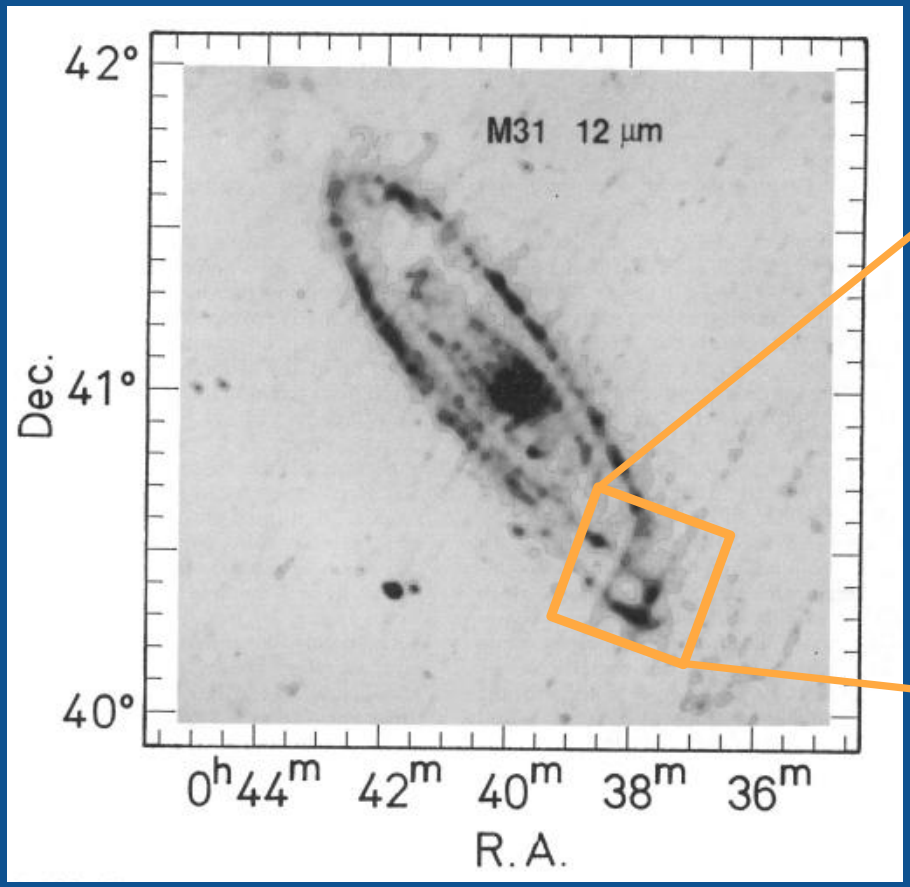


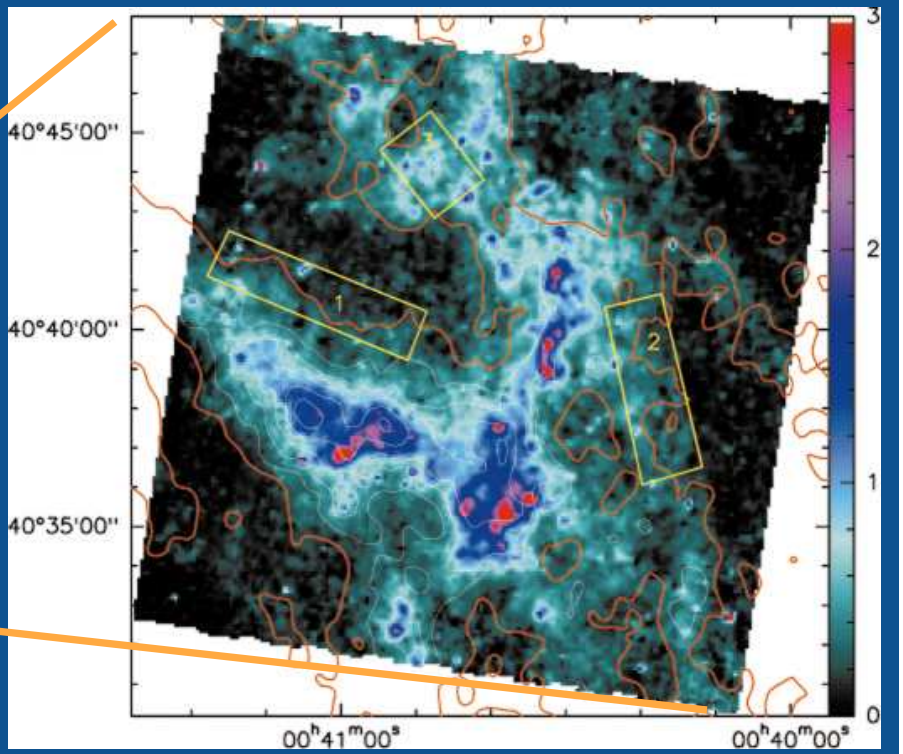
Pauline Barmby

Western University

Ontario, Canada

IRAS and ISO gave us the infrared big picture of M31



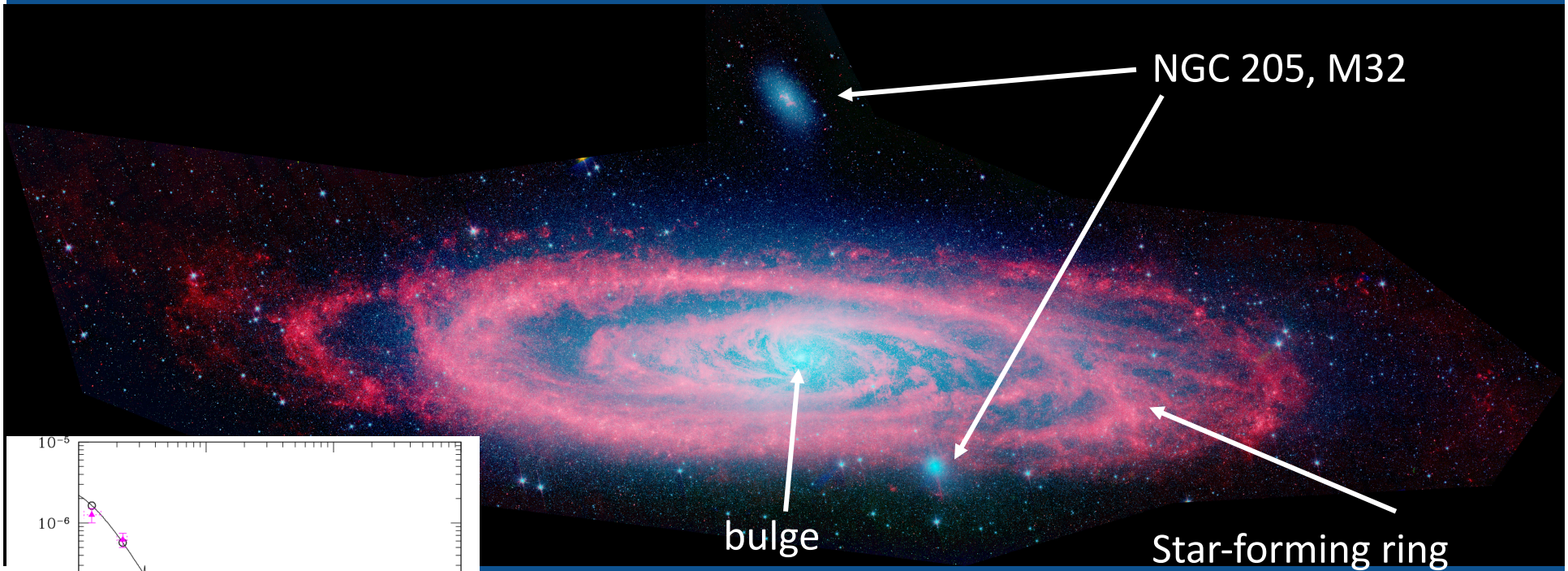


Xu & Helou 96; Pagani et al 99

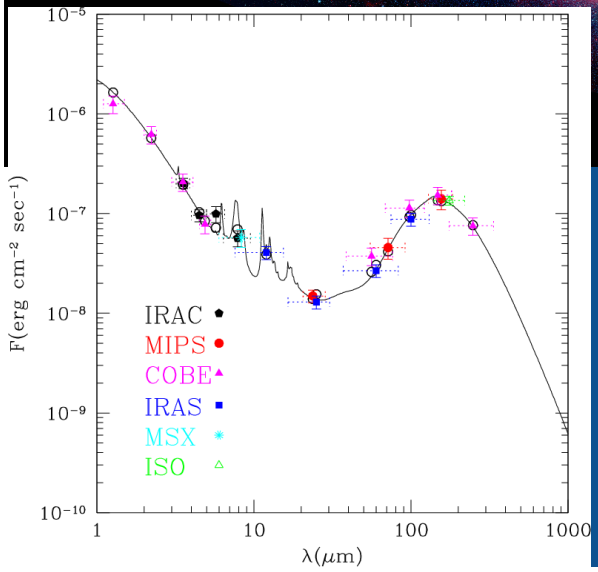
Spitzer/IRAC observations of M31 provides both big and small pictures

- measurement of global M_* and SFR
  - $M_* = 1.1 \times 10^{11} M_\odot$
  - SFR = 0.4 $M_\odot$/yr: quiescent galaxy
- Finding evolved stars
  - supergiants >10^6 $L_\odot$; some not visible in optical
- Testing population synthesis models with GCs
  - models seem to be pretty good

The mid-infrared sees both young and old populations

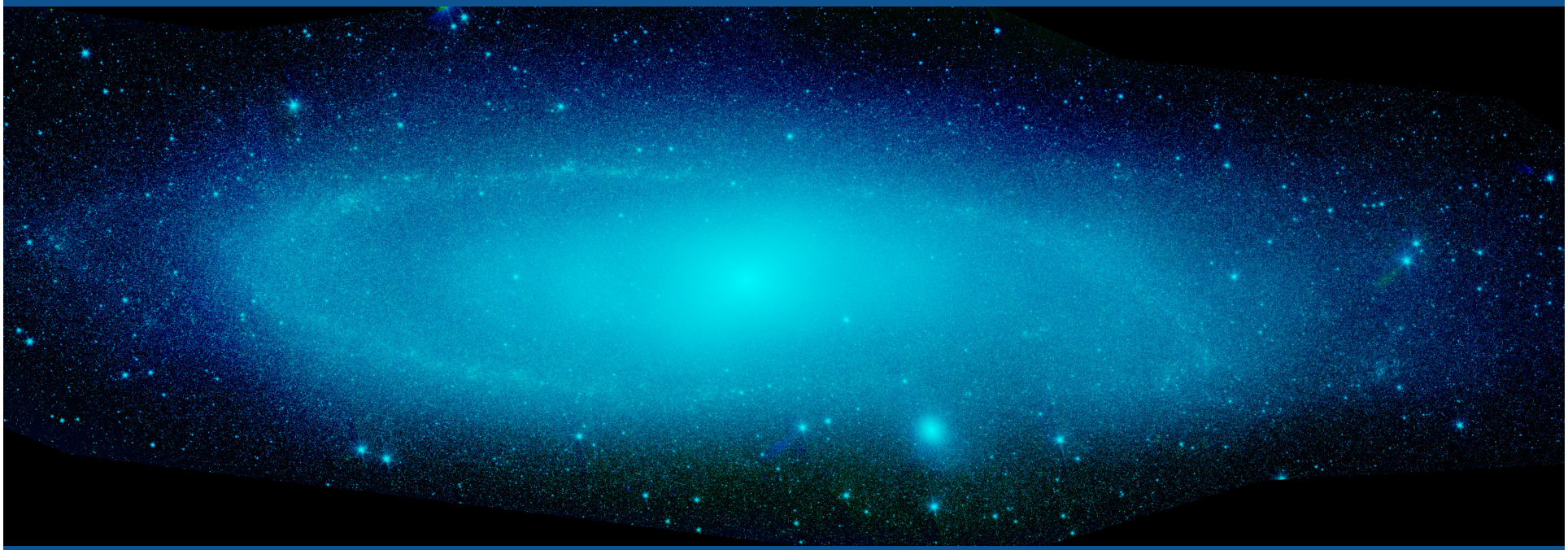


Barmby et al 06

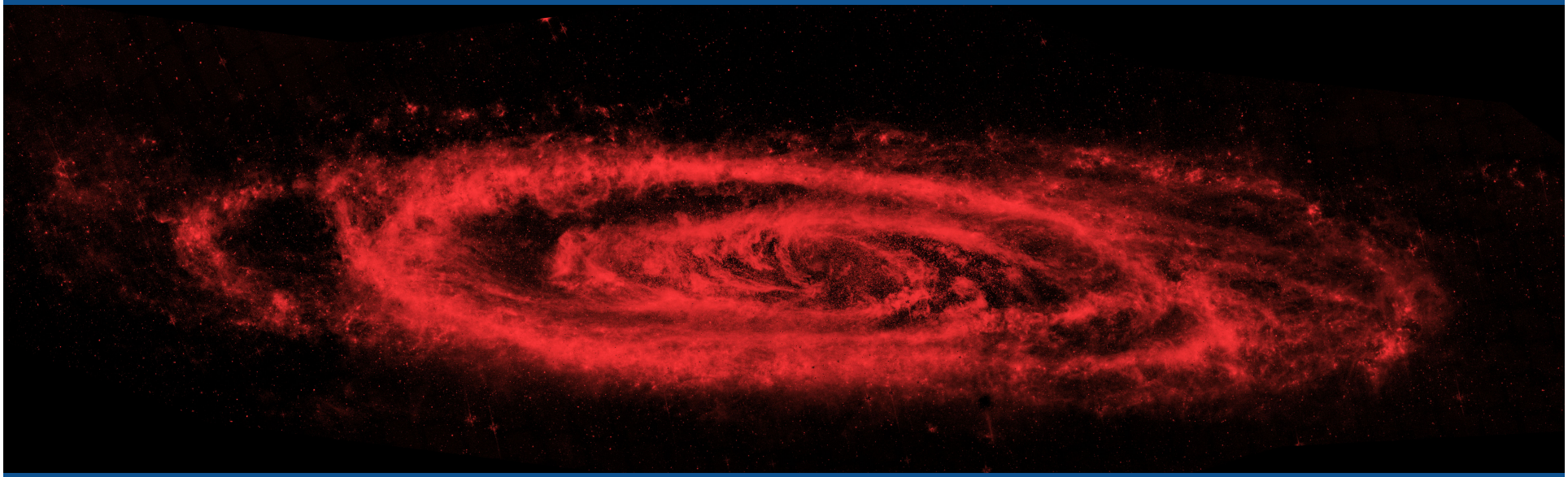


Montalto et al 09

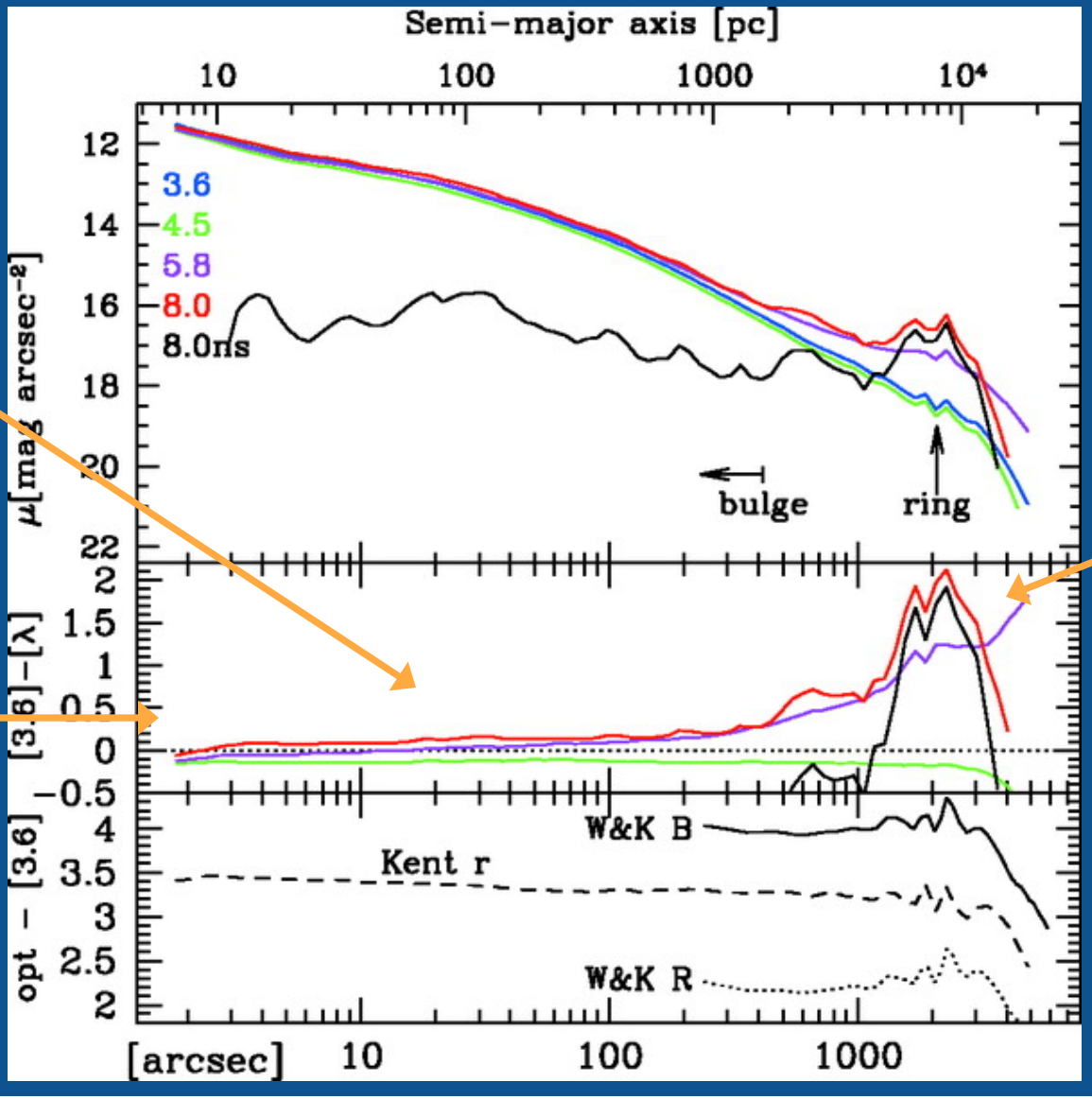
3.6 micron total luminosity gives a stellar mass consistent with dynamics



SFR derived from 8.0 micron luminosity agrees with FIR, Hα; larger than radio



IRAC surface brightness profiles extend over 3 decades in radius



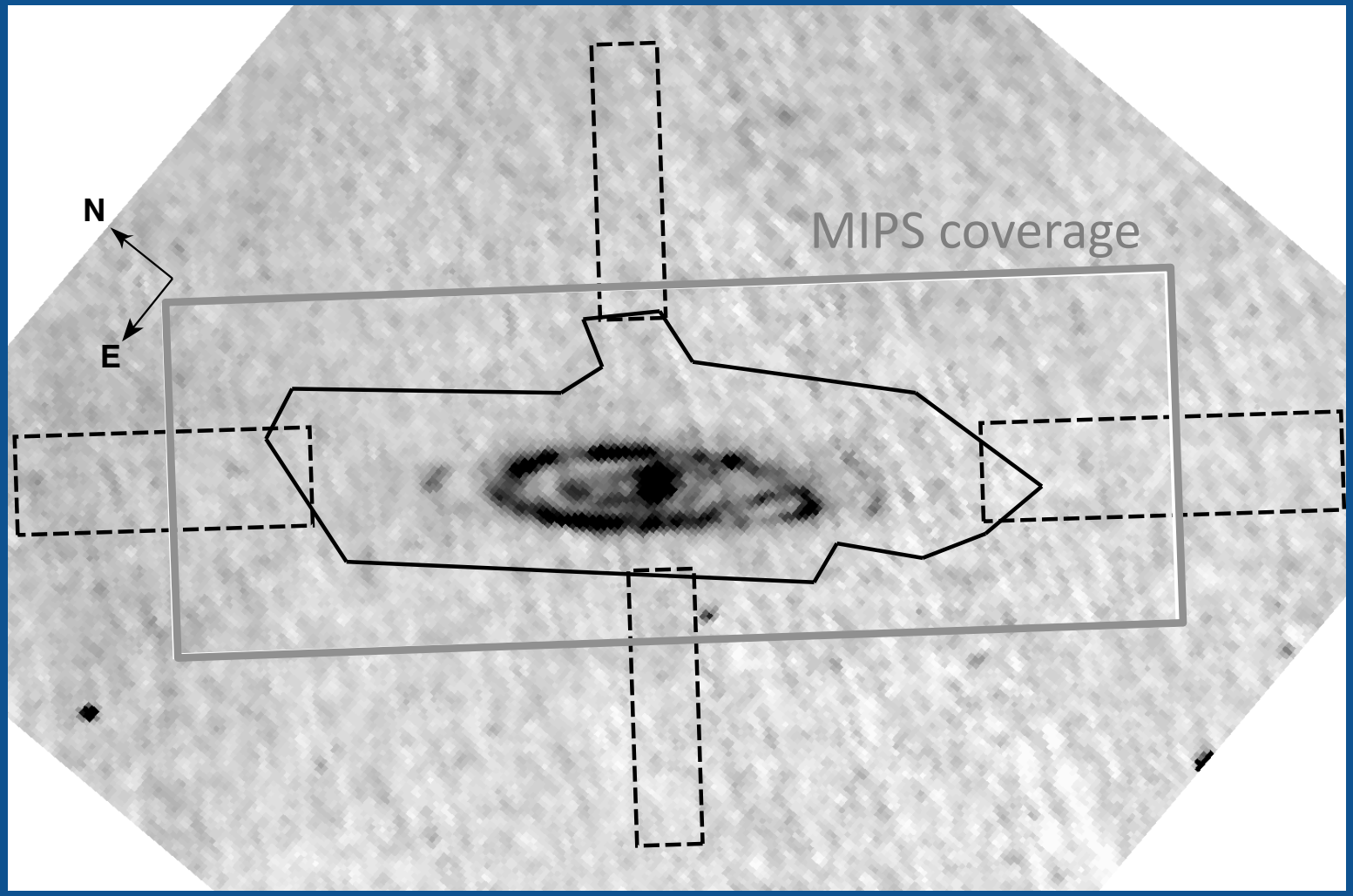
M0 III color

No red nucleus

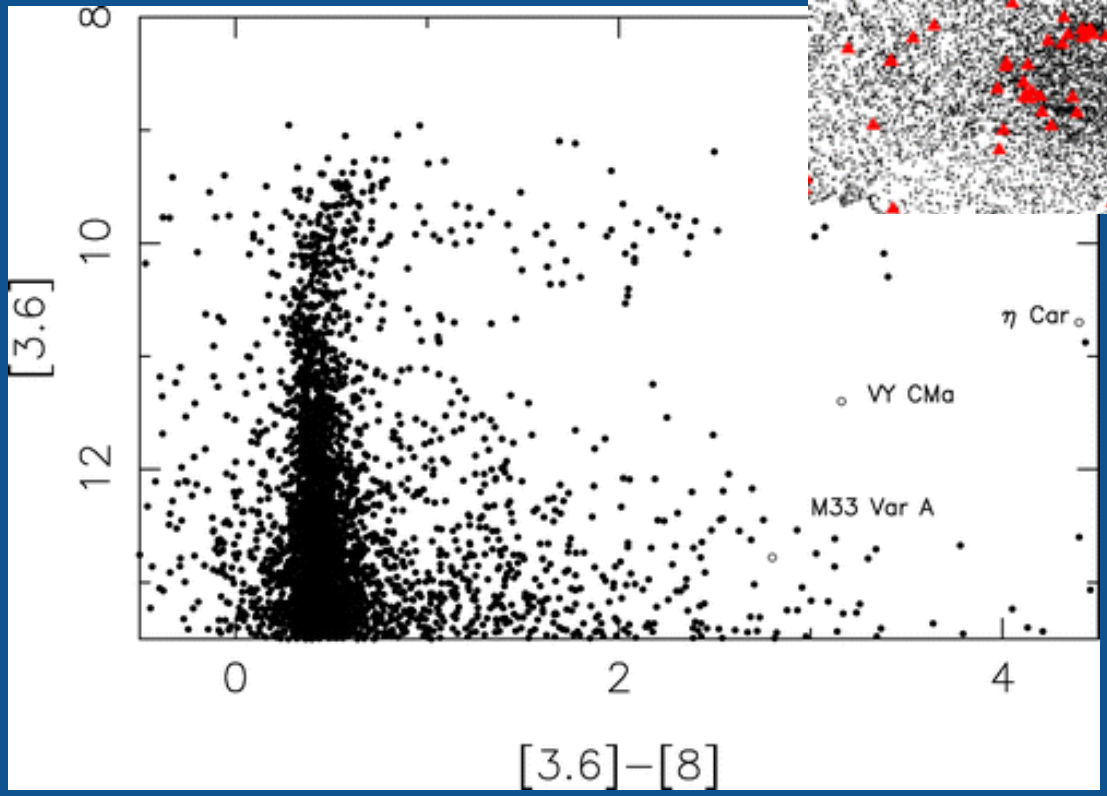
red ring

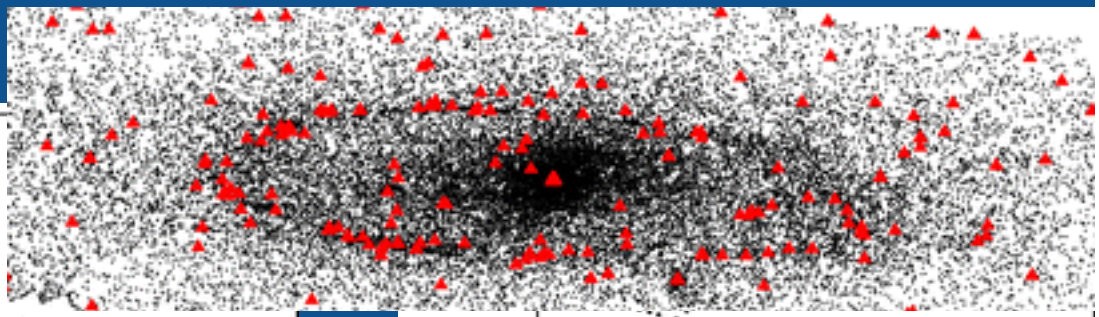
See also Courteau et al 2011

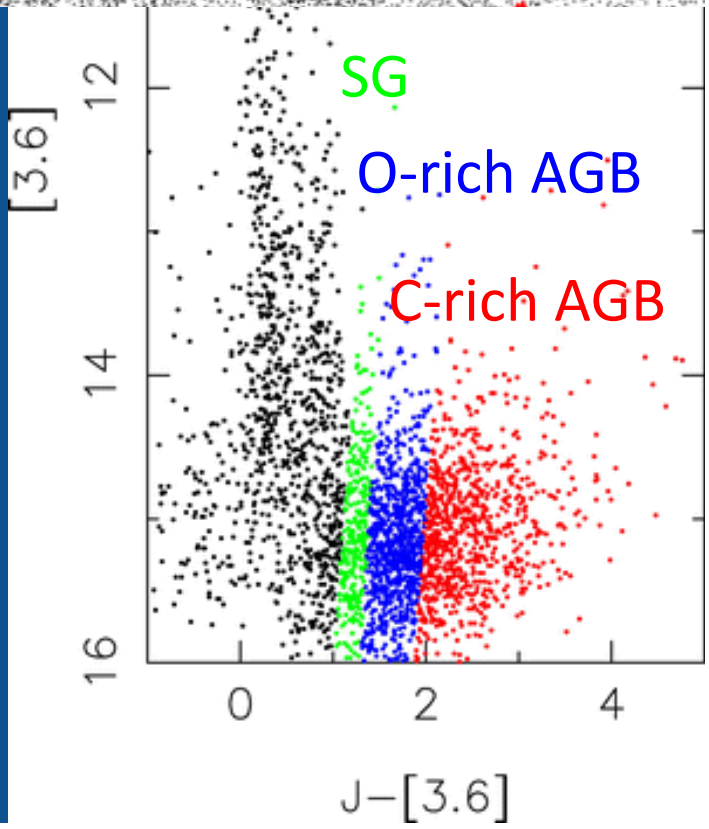
New observations will extend the IRAC profile to 6.6° x 4.4°



IRAC point-source photometry reveals a rich population of evolved stars



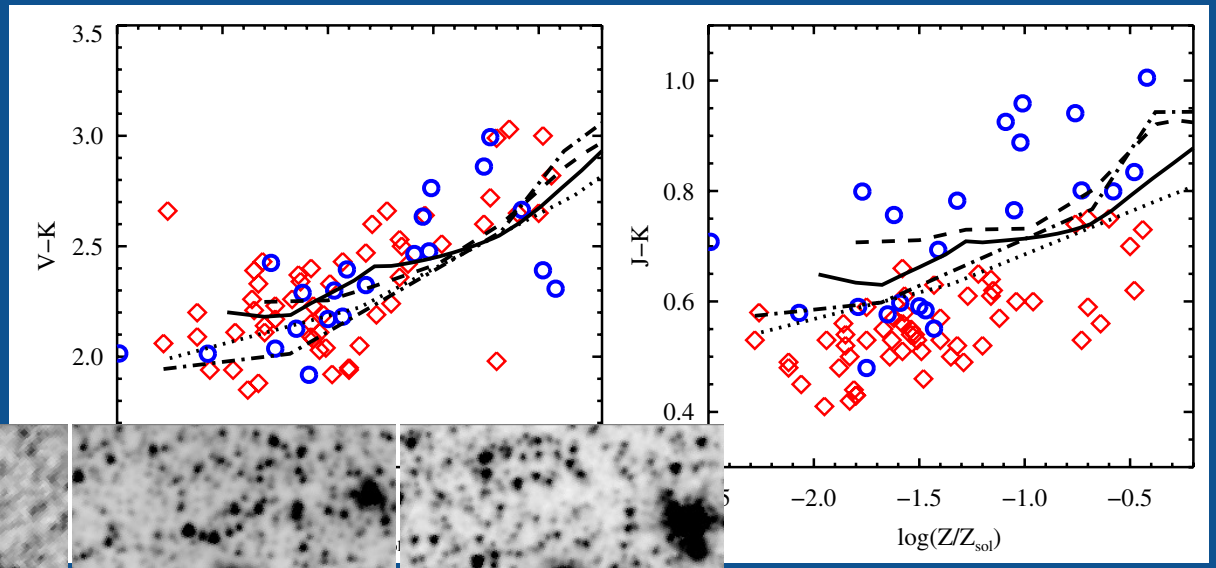


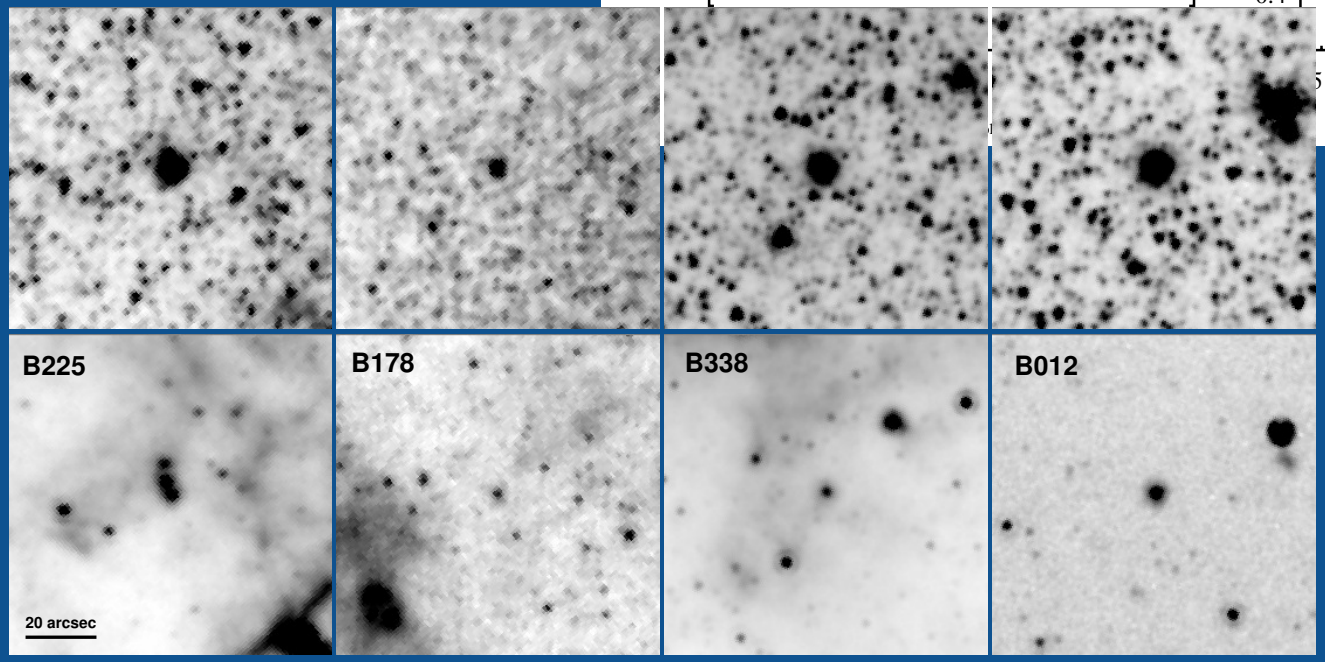


Mould et al 2008

M31's globular clusters can be used to test population synthesis models

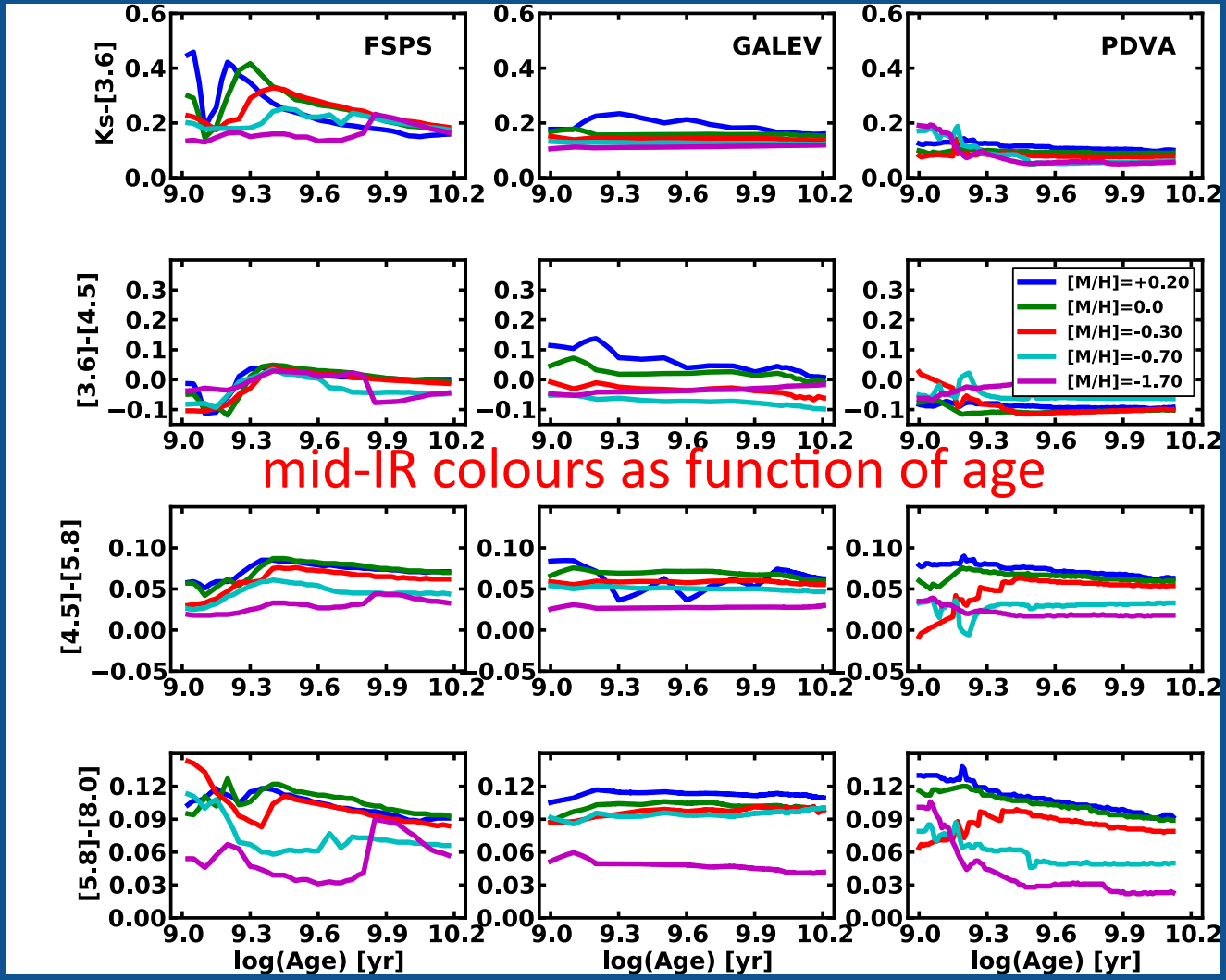
Conroy & Gunn 2010: Optical/ NIR colors as function (Z)





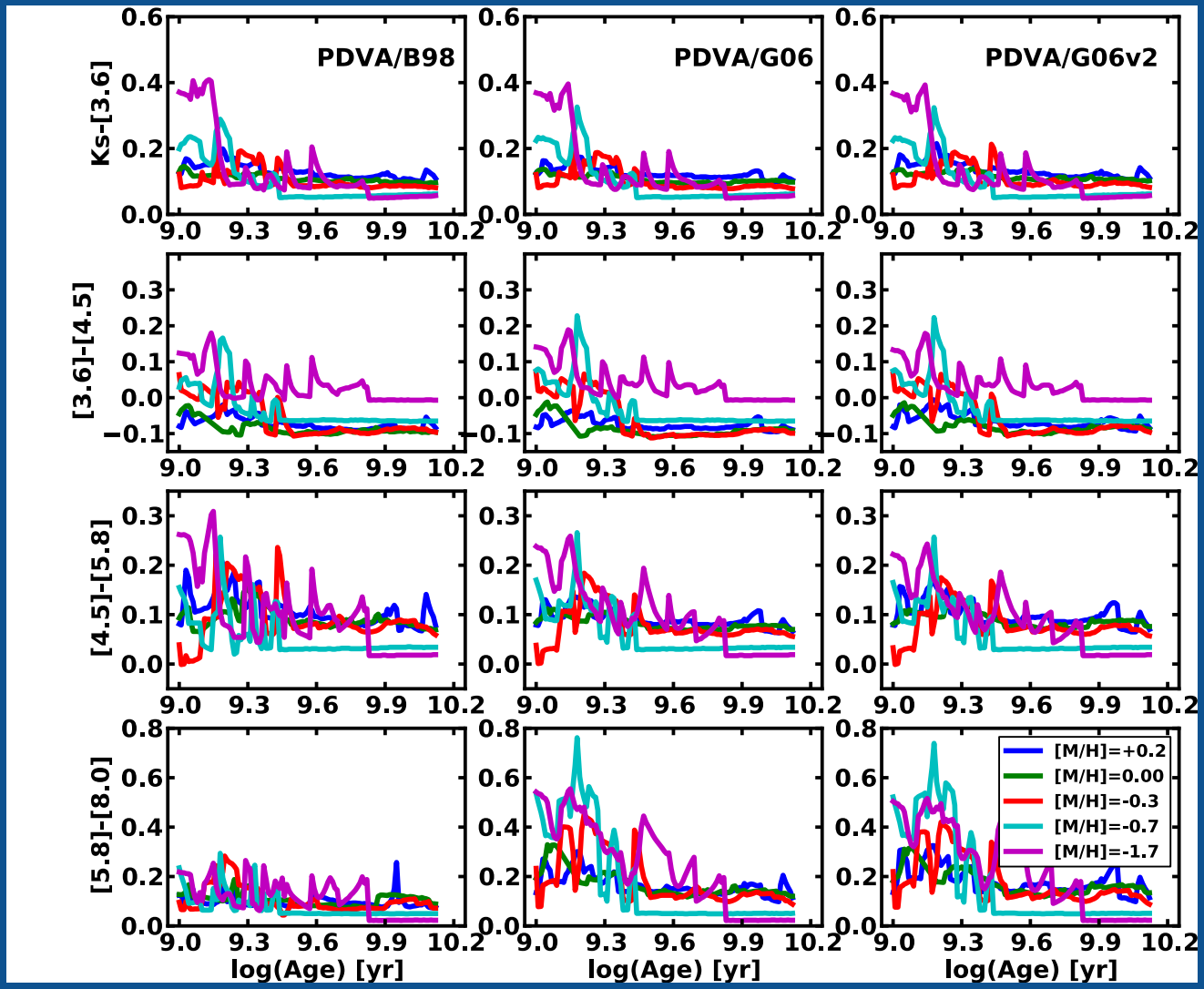
Barmby & Jalilian 2012

At mid-infrared wavelengths, different models don't quite agree

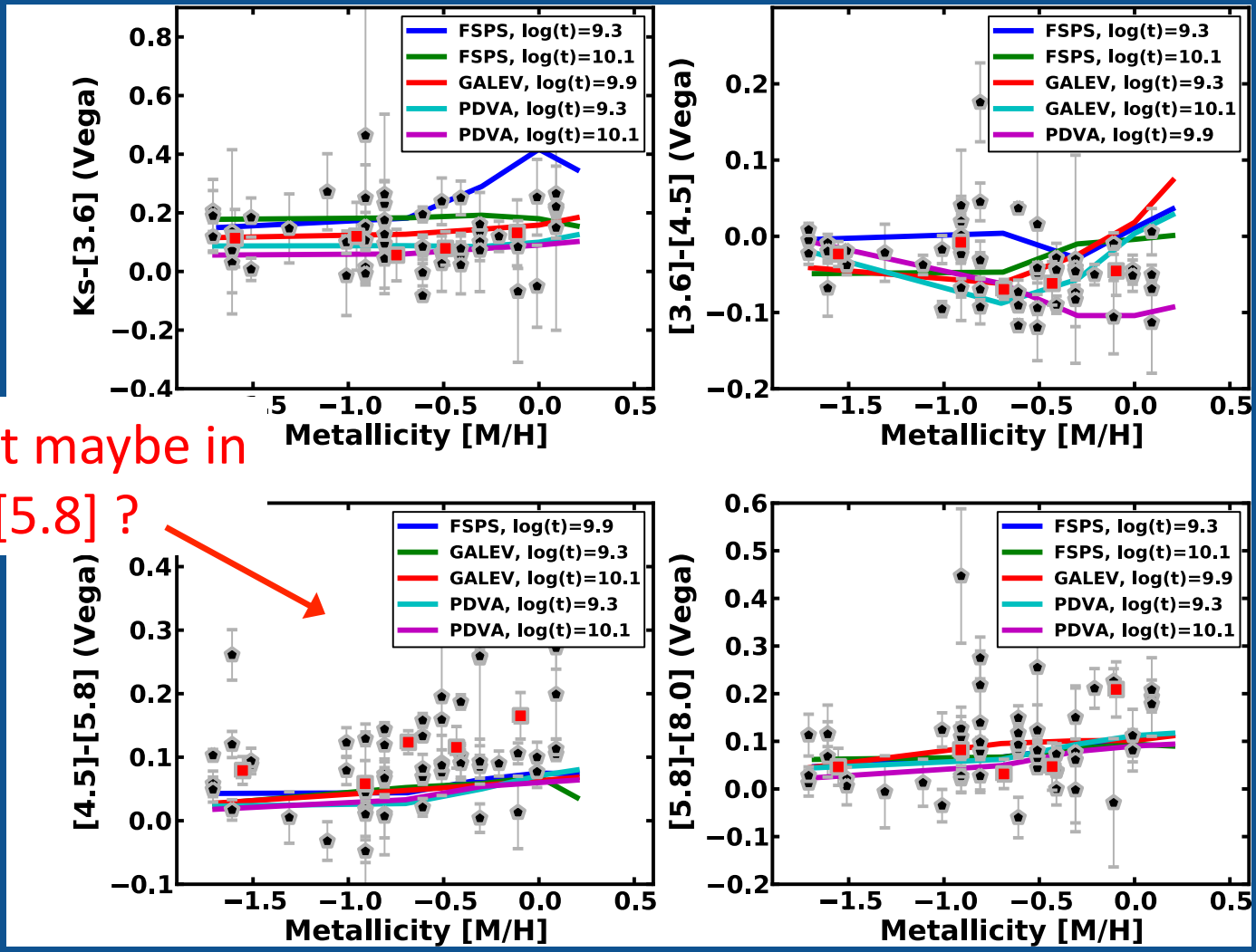


mid-IR colours as function of age

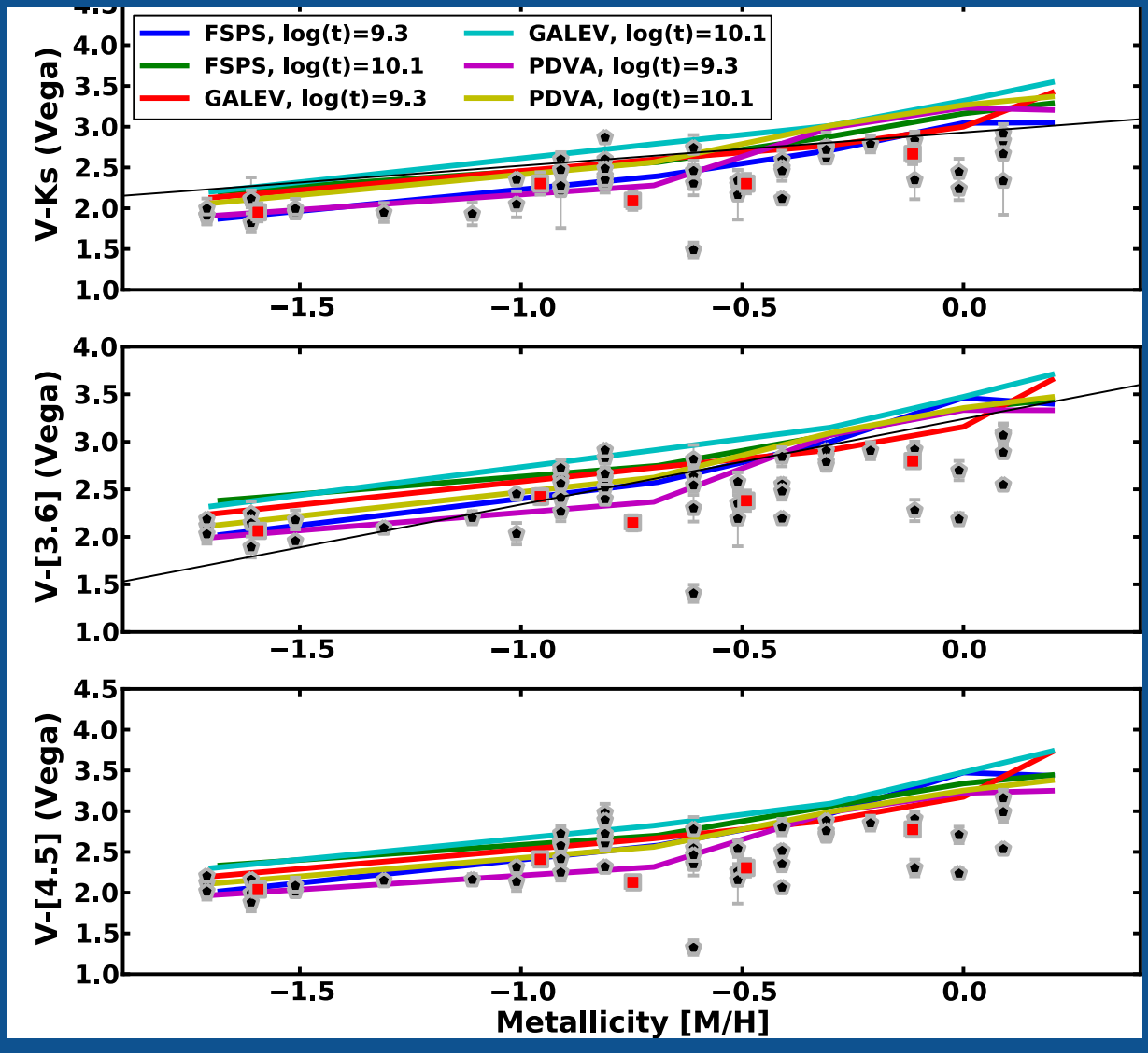
Including circumstellar dust makes the model outputs vary more



Within the uncertainties, models and data agree



Optical-to-IRAC colours could be good metallicity indicators



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- J. Mould (Swinburne)
- F. Jalilian (Western)