

The Specific SFR of DOGs & SMGs

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Importance of ULIRGs at z~2



Dole et al. 2006



Le Floc'h et al. 2005

- IRAS: at z~0, LIRGs are rare but dominate bright end of luminosity function
- Spitzer: (U)LIRG luminosity density increases with z

Dust-Obscured Galaxies (DOGs)

- F₂₄/F_R > 1000
- F₂₄> 0.3 mJy
- ~50% of z~2 ULIRG IRLD





DOGs & SMGs

- Similar luminosities, redshifts and clustering strengths
- Evolutionary connection?



Brodwin et al. 2008

A Cartoon Evolutionary Model



Testing this picture requires a multi-wavelength approach

- Morphologies w/ HST imaging (Bussmann et al. 2009a)
- Sub-mm imaging (Bussmann et al. 2009b)

Comparison of stellar masses and SFRs in DOGs and SMGs

The DOG & SMG Samples

DOGs

- Spec-z's from Spitzer/ IRS and Keck (Houck et al. 2005, Weedman et al. 2006, Soifer et al. in prep)
- $B_{W}RIJKs$, IRAC, MIPS
- SHARC-II 350µm (Bussmann et al. 2009b)



Spec-z's (Chapman et al. 2005)

• BRIJK, IRAC, MIPS, SHARC-II, SCUBA (Chapman et al. 2005, Smail et

al. 2004, Hainline et al. 2009, Kovacs et al. 2006)

Estimating Stellar Masses

- Mass constraints from B, R, I, J, 3.6μm,
 4.5μm photometry
- Bruzual & Charlot (2003) instantaneous burst simple stellar population
- Calzetti extinction law (2000)

Estimating DOG SFRs

- Kennicutt (1998):
 SFR ∝ L_{IR}
- L_R: integrate over grey-body
 - β = 1.5
 - $T_{dust} = T_{dust}(L_{R})$ (e.g., Younger et al. 2009)
 - normalization



Specific SFRs of DOGs & SMGs



- M_{star} similar for SMGs and DOGs
- For a given stellar mass, bump DOGs have lower SFR (later evolutionary state?)

 Caution: may inhabit different mass halos

Summary

- DOGs and SMGs are complementary, possibly related populations of z ~ 2 ULIRGs
- Comparison of their global properties is important
 - Morphologies and dust temperatures/masses; Bussmann et al. 2009ab)
 - DOGs may have lower SFRs for a given stellar mass than SMGs (see D. Narayanan's talk)
 - ALMA: large samples of gas masses

Comparison to FLS sample



Desai et al. 2009

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