

Guillermo Barro (UC Santa Cruz, postdoc)

S Faber (UC Santa Cruz)

P G Perez-Gonzalez (UCM)

J Trump (Penn State)

Presentation Requested: oral

Category: Assembly of Galaxies / Mass & Structure Evolution

Question: Other

Compact dusty SFGs at $z = 2$ The progenitors of the first quiescent galaxies

The mechanisms responsible for the remarkably small sizes of quiescent galaxies at $z=2$ are poorly understood. Partly because the nature of their progenitors is still unknown. In Barro et al. (2013,2014), we used the deepest CANDELS WFC3/F160W data to identify, for the first time, a population of massive $M > 10^{10} M_{\odot}$ compact star-forming galaxies (cSFGs) at $2 \leq z \leq 3$, whose structural properties and number densities suggest that they are the progenitors of such population. We find that cSFGs present heavily obscured star-formation based on their optical/NIR (UVJ) and far-IR colors, with 71% of the compact SFGs hosts X-ray luminous AGNs. Structurally, compact SFGs present spheroidal morphologies and centrally-concentrated mass profiles very similar to those of quiescent galaxies, but strikingly different from those of other (extended) SFGs. Follow-up NIR spectroscopy reveals broad ($\sigma \sim 200$ Km/s) $H\alpha$ emission lines suggesting that compact SFGs experienced a strongly dissipational transformation that turned them into dispersion dominated galaxies. In an approved Cycle 2 ALMA proposal we will carry out high resolution ($0.12''$) 320GHz dust emission observations of compact SFGs to test whether their remarkably small optical sizes ($r_{eff} < 1.5$ kpc) are consistent with the sizes of their star-forming regions, and if their inferred gas fractions are consistent with the short quenching timescales required to make them immediate progenitors of $z = 2$ compact quiescent galaxies.