Some unsolved extragalactic problems / future prospects

- What is physical origin of the simple scaling laws that are seen in the integrated properties of galaxies and the division between the SF "main sequence" and the SB galaxies ?

- Can we accurately separate out AGN and SB for Lbol at high-z ? What will replace LIR for fitting/understanding high-z galaxies ? Compactness ?

- How important are mergers as drivers for galactic evolution ? Just the SB mode ? How can we detect cold flows ?

- How effective is feedback (non-radio mode) at quenching SF ? What provides most of the pressure (photons, hot gas, CRs) ?

- What prevents all the gas > stars at very high-z ? How do you build massive gas-rich (thin) disks ?

Some unsolved extragalactic problems / future prospects

- What drives the range in I(CO)/H2 & what should be used at high-z ? Is CO-dark H2 common ? How do we find it, [CII] ?

- What is responsible for the MIR -to- FIR line and the CII/FIR deficits in high luminosity/warm galaxies ? Covering fraction, optical depth, density, UV density...

- Can we understand heating and cooling of the dust (large and small grains) and gas (ionized and neutral) by combining Spitzer & Herschel data ? PAHs, [CII], [OI], FIR, etc.

- How do you go from HI > GMCs > cores > stars ? Are B-fields critical ?

- How important/common is spinning dust for FIR/cm excess seen in some galaxies ? What are the implications for Galactic foreground removal ?