Fundamentals : Some Questions

- Can we write down a universal star formation law?
- Are the scaling relations of galaxies (MZR, KS, MS, wind scalings…) set by local or global physical processes?
- When/why do disks settle into the razor-thin structures we see today?
- Can we think of the build up of stars and metals in a disk as something that mainly occurs in nearly independent radial rings?
- Is galaxy formation really quite simple?

Fundamentals : Some Questions

- Is a universal star formation law required to understand the build up of stellar mass?
  - Do small scale star formation processes (eg spiral arms) matter for our understanding of star formation on large scales?
  - is there a relevant scale for star formation?
  - What is setting the (apparent) self-regulation of the star formation process?
  - If we could write down an effective star formation law (on kpc? scales), what would this depend on?

Fundamentals : Some Questions

- Are the scaling relations of galaxies (MZR, KS, MS, wind scalings…) set by local or global physical processes?
  - are properties such as metallicity, tdep, sSFR, eta set by global conditions (halo mass, cosmological accretion rates, characteristic timescales of the galaxy as a whole such as t_orb, …) or by local ones (timescales related to cloud t_ff, or disk scaleheight, local stellar or SFR surface density?

Fundamentals : Some Questions

- When do disks settle into the razor-thin structures we see today? To be more precise, if we could measure the velocity dispersion sigma of the cold ISM as a function of z and halo mass, what would the function V/sigma(z, Mh) look like?
- To what extent can we think of the build up of stars and metals in a disk as something that mainly occurs in nearly independent radial rings, which form inside out because high angular momentum gas accretes at later times, and to what extent is redistribution between the rings a critical phenomenon? Is redistribution important for explaining some properties of modern day galaxies but not others? If so, for which properties is redistribution important?

Fundamentals : Some Questions

- Is galaxy formation simple?
  - How far can we get by just treating the galaxy as a black box in which gas flows in, some gets converted into star and some gets blown out
    - what really matters is the outflow rate relative to the star formation rate
- Is there any observational evidence for this picture?
- What is the next level of approximation? is a 1 kpc model sufficient? What else do we need to know in order to improve this picture?
- What do we need to measure to challenge this idea?