# Breakout 2: Evolution of Global Properties of Galaxies of Cosmic Time

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# Big Questions

- Is CDM hierarchical growth the correct paradigm?
  - Galaxy properties vs. large-scale structure
    - deep photz, spectroscopy over large areas
    - Full spectral coverage stellar content over wide z range
- What is the feedback cycle?
  - AGN? SNe? Infalling subhalos? Metagalactic UV?
    - High resolution IFU spectroscopy
- How do super-massive black-holes form & evolve?
    - Time series (smaller telescopes)
    - High-resolution IFU spectroscopy

# Big Questions, continued

- Nature of Dark Matter
  - Cusps, substructure
    - Nearby galaxy kinematics
    - Cluster lensing
- Nature of Dark Energy / Gravity
  - BAO, Weak lensing, SNe, cluster growth

# Competitive Landscape

- Big optical imagers
  - Subaru, VST
  - LSST and Pan-Starrs, DEC coming
- NIR imaging on 4-m class
  - VISTA, UKIDSS, CFHT
- Spatially resolved spectroscopy
  - SAURON
  - SINFONI, OSIRIS, NIFS
- Big MOSs
  - VIMOS, DEIMOS, IMACS
    - limited US public access
    - Have they reached their size & efficiency limit?
  - WFMOS in the offing?

# Instruments

Wide-deep NIR seeing-limited imagers (soon)

- 4x gain over today on 8-m class; good QE 0.8-2.5 microns; narrowband useful

- Wide-field MOS (optical) (soon as well)
  - Fibers vs. slits?
  - Public access to current big MOS is limited
- Deeper NIR spectroscopy (study; high priority)
  - Low scattered light & detector noise
- SAURON on an 8-m
  - Low scattered light & detector noise

# Instruments (later)

- Multiplex at the diffraction limit
  - Build on SINFONI, OSIRIS, …
- Improve the diffraction limit (still later)
  - Interferometry (especially IFU spectroscopy)

# System comments

- Further priority setting between workshops
  - Steering committee?
- Capability for larger surveys
  - But how do you keep community involved?
  - But protect time for have-nots?
- NSF support for emerging technologies