

GSMT: Stellar Populations

What is out there?

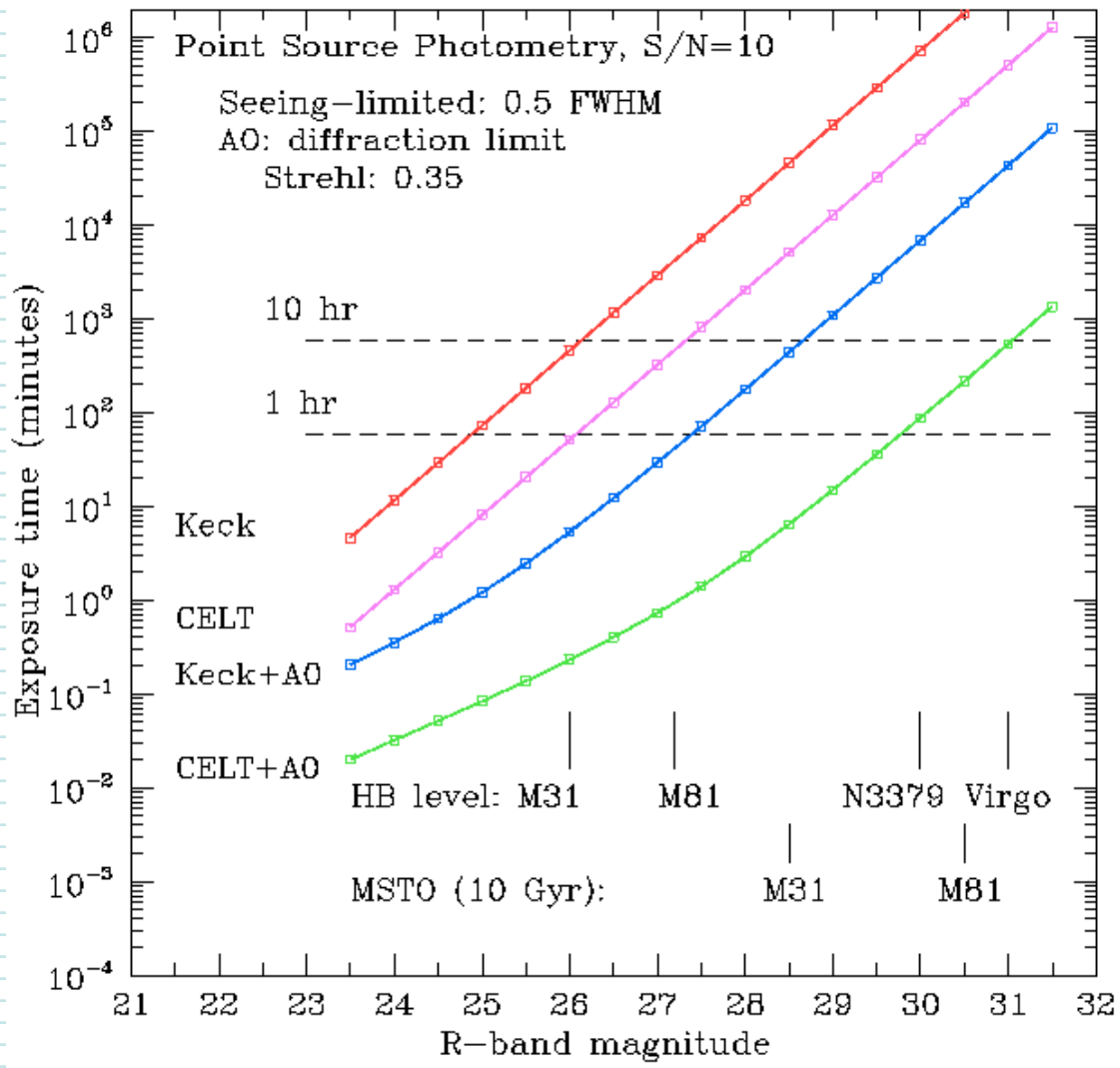
- Panel report from GSMT
 - Summary at NIO site
 - Full report from R. Wyse (33 pages)
- CELT Greenbook Science Case
- Scotland workshop
- CFHT Replacement document

What are the main topics

- Extending 'fossil record' studies of resolved stellar populations to Virgo Cluster galaxies
- CMD studies
 - Main-sequence turnoff ages
 - $[Fe/H]$ and $[Fe/H]$ spread from RGB morphology
- $R=5000$ to 50000 spectroscopic studies
 - Kinematics
 - Detailed chemical compositions

Main topics cont.

- Directly determine star formation and chemical evolution histories for very large sample of galaxies from throughout the Hubble sequence.
- With 10m telescopes, limited to Galaxy, M31 and their satellites.



Sample questions

- What are the star formation histories for M31 & M81 and their dwarf complements?
 - 30m + AO would allow photometry to a 12Gyr turnoff at the distance of M31
 - M81 and beyond, HB morphology

Sample questions cont.

- What is the detailed chemical distribution history of M31?
 - Is there a floor to $[\text{Fe}/\text{H}]$ for the M31 halo?
 - R-process contribution, s-process contribution, IMF inferences
 - $R \sim 30000$ spectroscopy to $V=22.5$
- Is there a significant population of young stars in giant elliptical galaxies?
 - Photometry to HB ($V=31$) @ Virgo

Sample questions cont.

- Did star formation commence at the same time throughout the volume of space to Virgo?
- What are the roots of the diverse SFHs we see in the Milky Way dSph galaxies?
 - expand the sample from nine to hundreds of dwarf galaxies in a large range of environments

What might be missing from current discussions?

- Real simulations
 - Crowding
 - Effects of realistic PSF for AO photometry and spectroscopy
- Tools required for using diagnostics in the near-IR (CMD/abundances) - most of the gains will require AO with moderate or better strehl -- likely only possible longward of 1 micron for the next few decades)
- Young stellar populations (Rolf?)

What might be missing from current discussions?

- The stellar pops potential of a 30m O/IR could be tightened and focused considerably!