

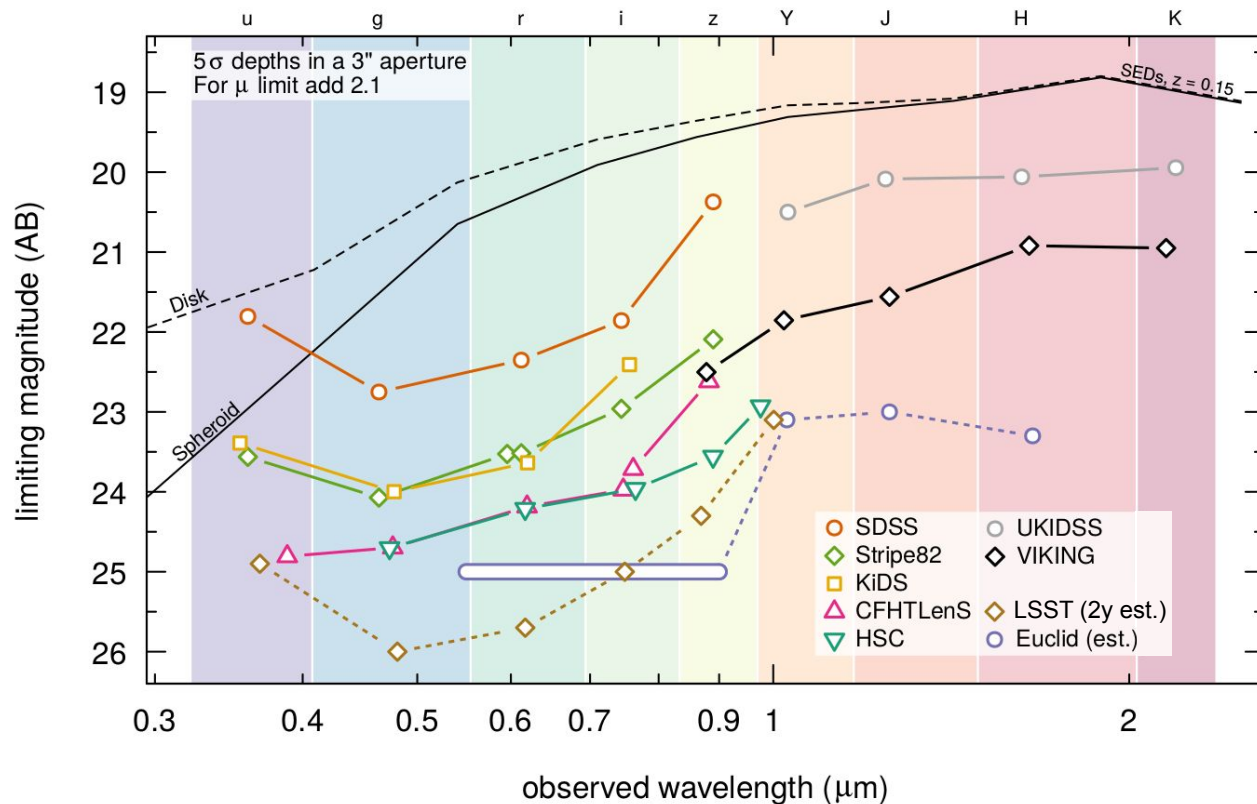
Rubin Observatory

The low-surface-brightness Universe: a vast new discovery space for LSST

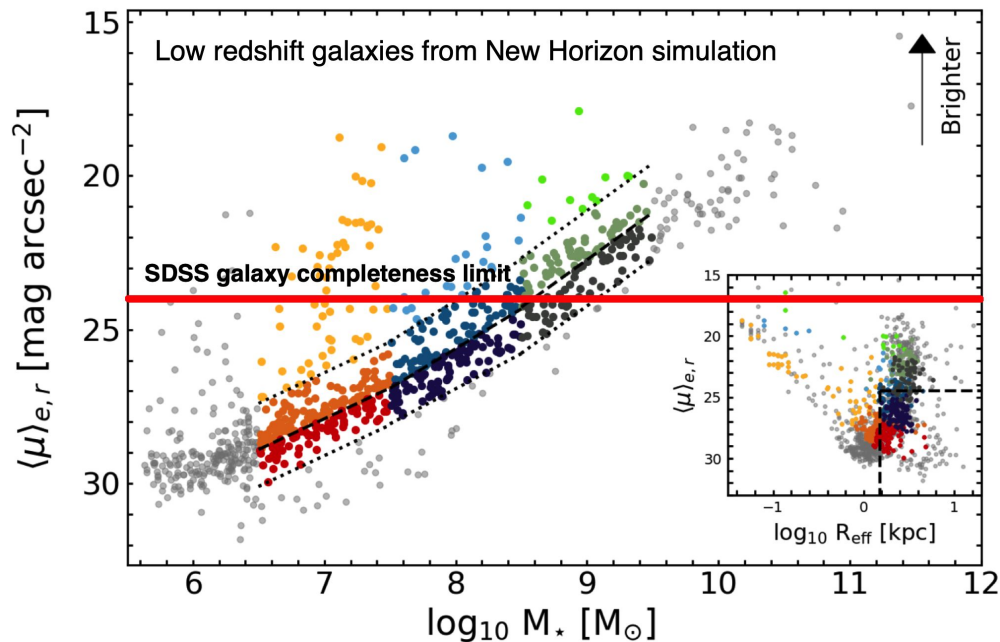
Sugata Kaviraj and Lee Kelvin



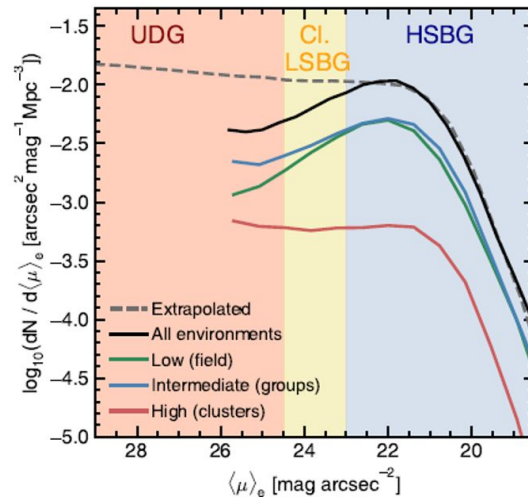
The game-changing depth of LSST



Most galaxies reside in the LSB regime



Jackson et al. arXiv:2007.06581



Martin +19, MN, 485, 796

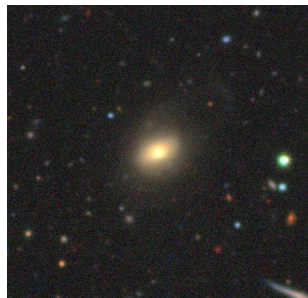
85% of galaxies down to $10^7 M_{\odot}$
are in the LSB regime

Key LSB structures - ICL and tidal features

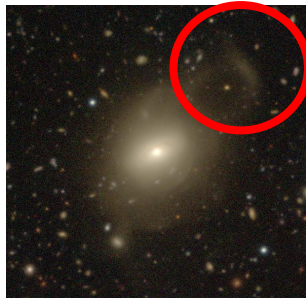
SDSS



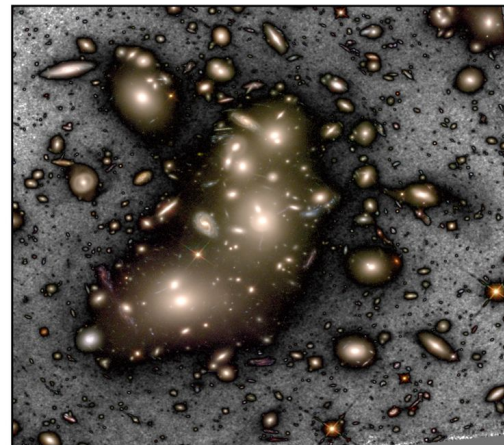
DECaLS



HSC PDR2



- Tidal features are key to understanding the role of merging in galaxy evolution
- But most mergers have low mass ratios, so most tidal features are faint ($26+ \text{ mag arcsec}^{-2}$; e.g. [Martinez-Delgado +08, ApJ, 689, 184](#))



[Montes +19, MN, 482, 2838](#)

- Galaxy clusters are key probes of our cosmological model
- But a significant fraction of the cluster baryons are in the diffuse ICL (e.g. [Burke +15, MN, 449, 2353](#))

- Significant untapped discovery space for extra-galactic (e.g. mergers, ICL, dwarfs) and Galactic (e.g. cirrus, resolved stellar pops) science which is accessible to LSST
- But data processing challenges exist to fulfilling LSST's full potential (e.g. sky subtraction, PSF, image artefacts)