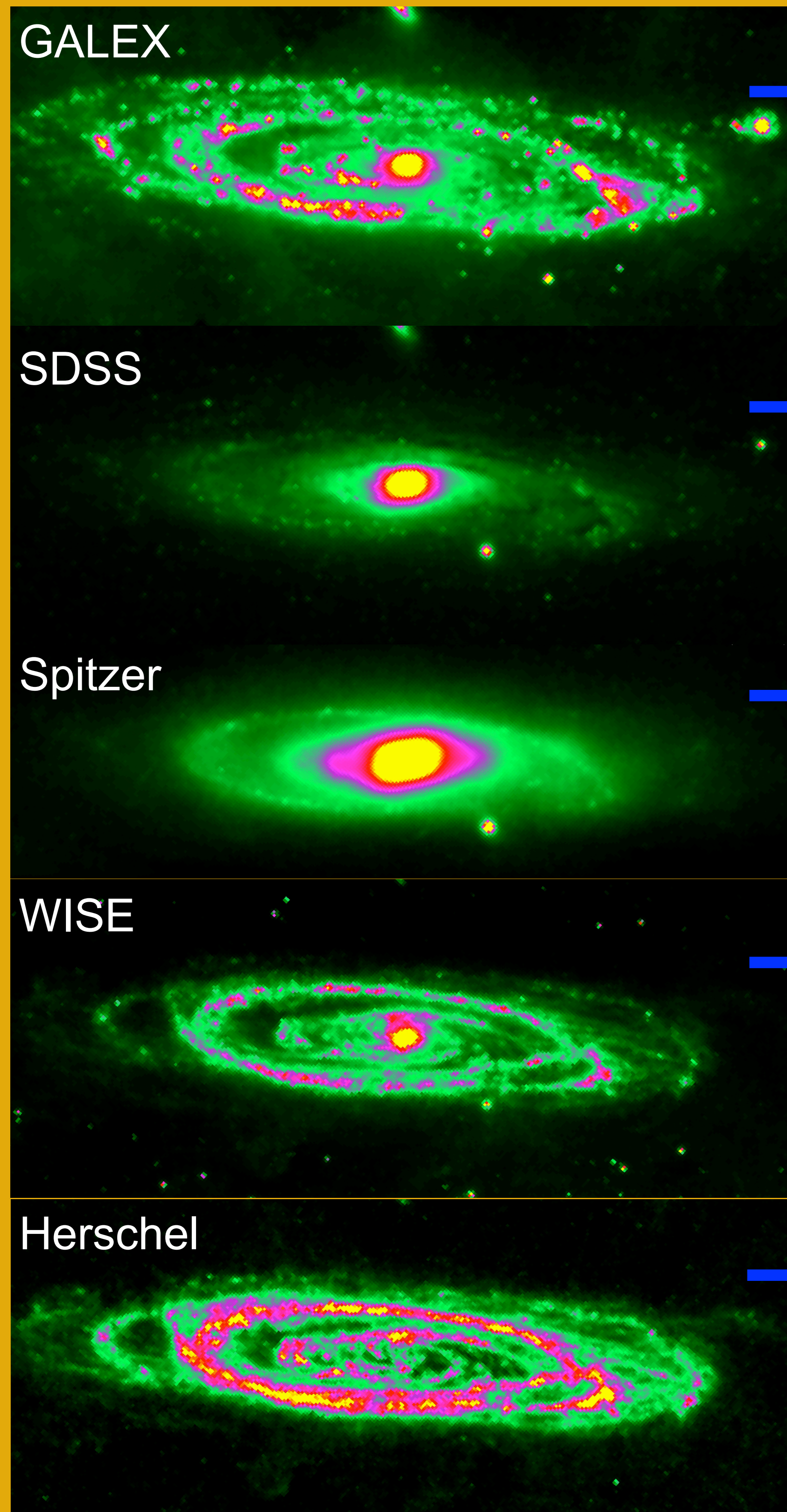


HELGA: The Resolved SED of Andromeda

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A PANCHROMATIC DATASET

We investigate the link between the interstellar medium (ISM), star formation and galaxy evolution with a focus on interstellar dust, which governs both chemical processes and interactions with starlight.

The Herschel Exploitation of Local Galaxy Andromeda (HELGA, Fritz et al. 2012) provides far-infrared (FIR) observations of our nearest neighbor, M31, at unseen resolutions. We combine these maps with existing data across the spectrum from the GALEX, SDSS, WISE and Spitzer telescopes.

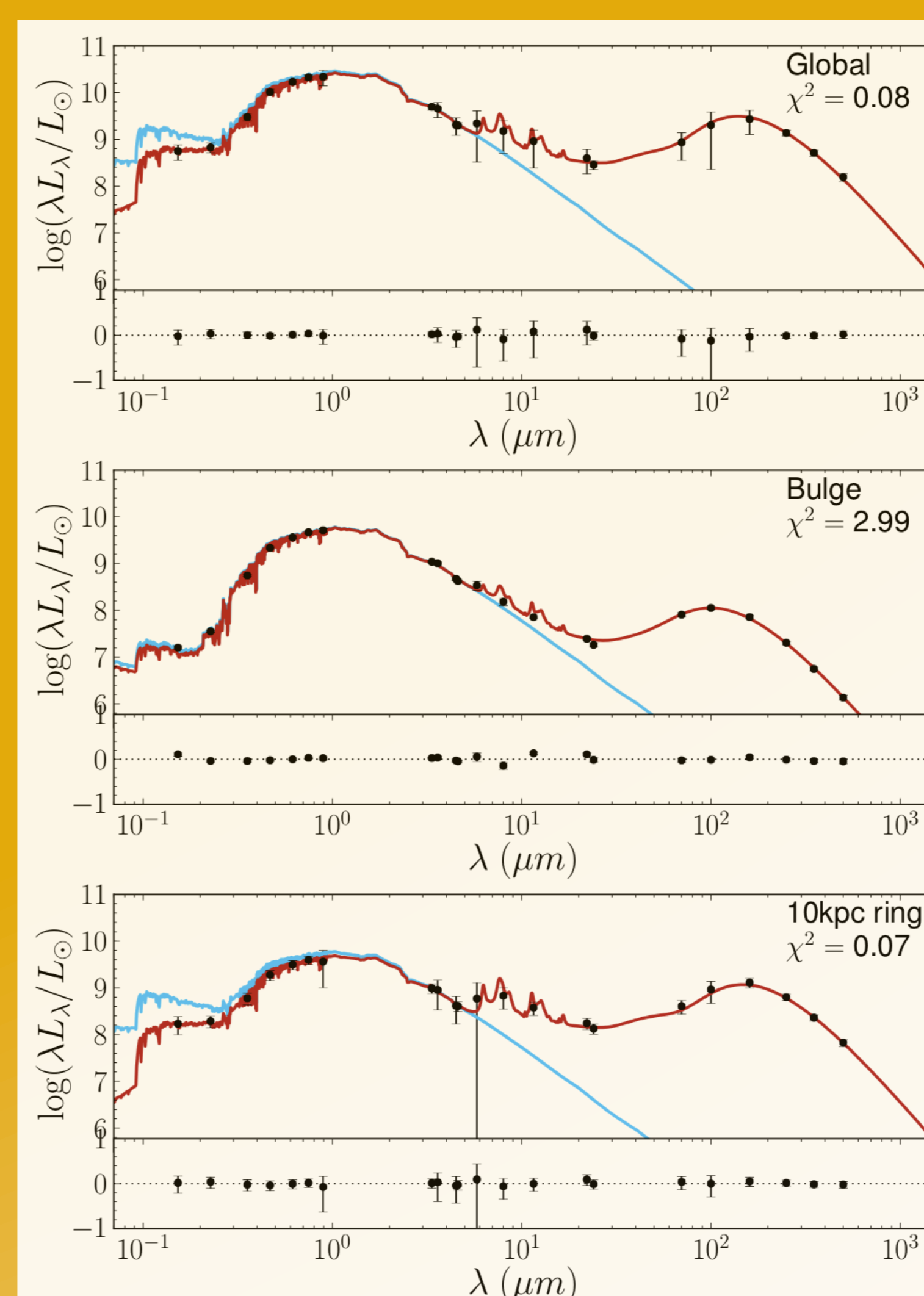
All images were masked, convolved and regridded, creating over 20000 independent pixels at a local resolution of ~ 140 pc. To all these pixels, we fit a panchromatic spectral energy distribution (SED).

MAGPHYS

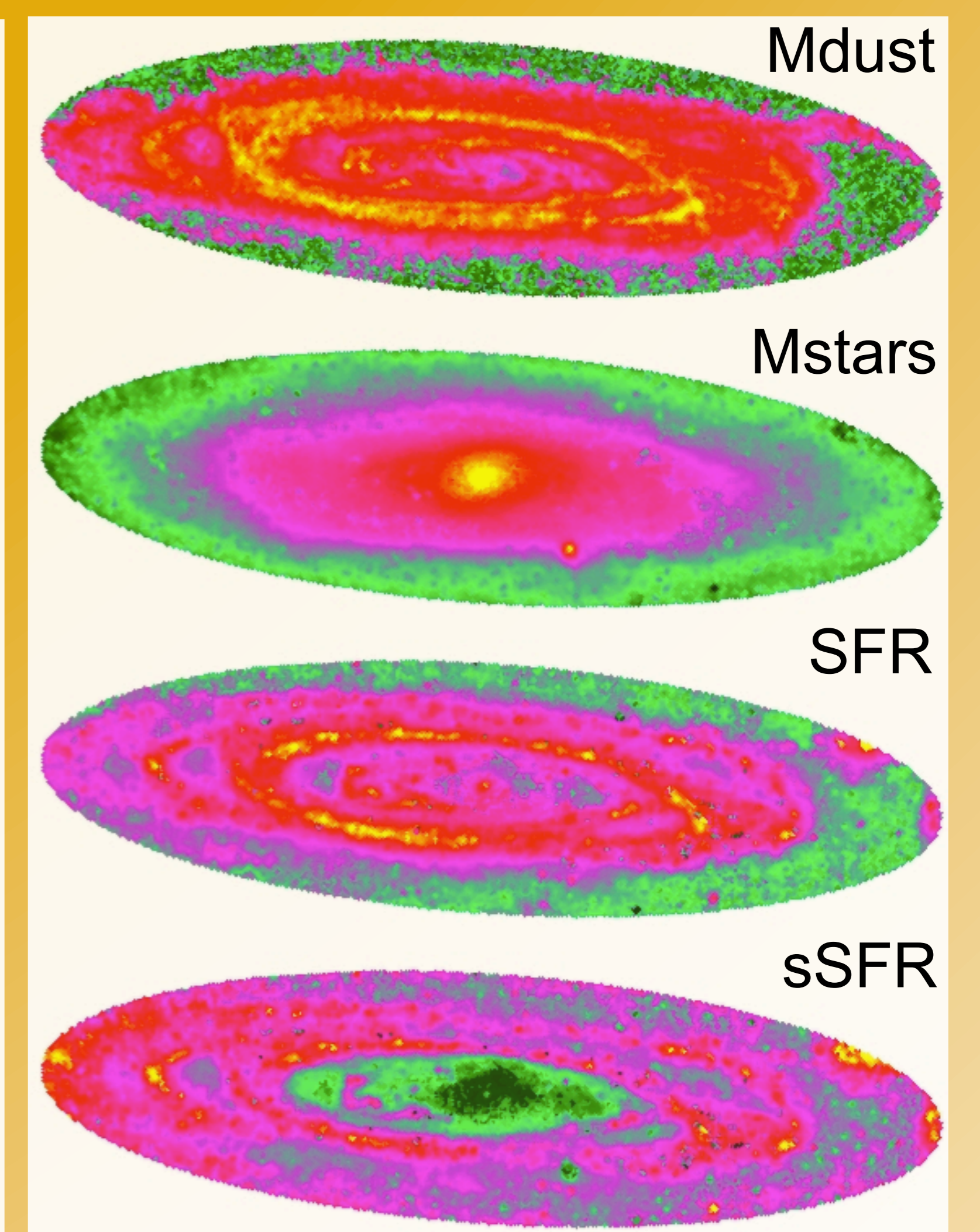
The SED of all these pixels is fitted by means of MagPhys (da Cunha et al. 2008), following a Bayesian approach. A large set of optical and infrared SEDs, physically related, is used to reproduce the observed photometry, yielding the probability density function (PDF) for numerous physical parameters.

Dust properties (distribution, mass, temperature,...), stellar mass, star formation history,... are derived, allowing to make parameter maps of the galaxy, decompose M31 in local SEDs and investigate scaling relations.

LOCAL SEDs



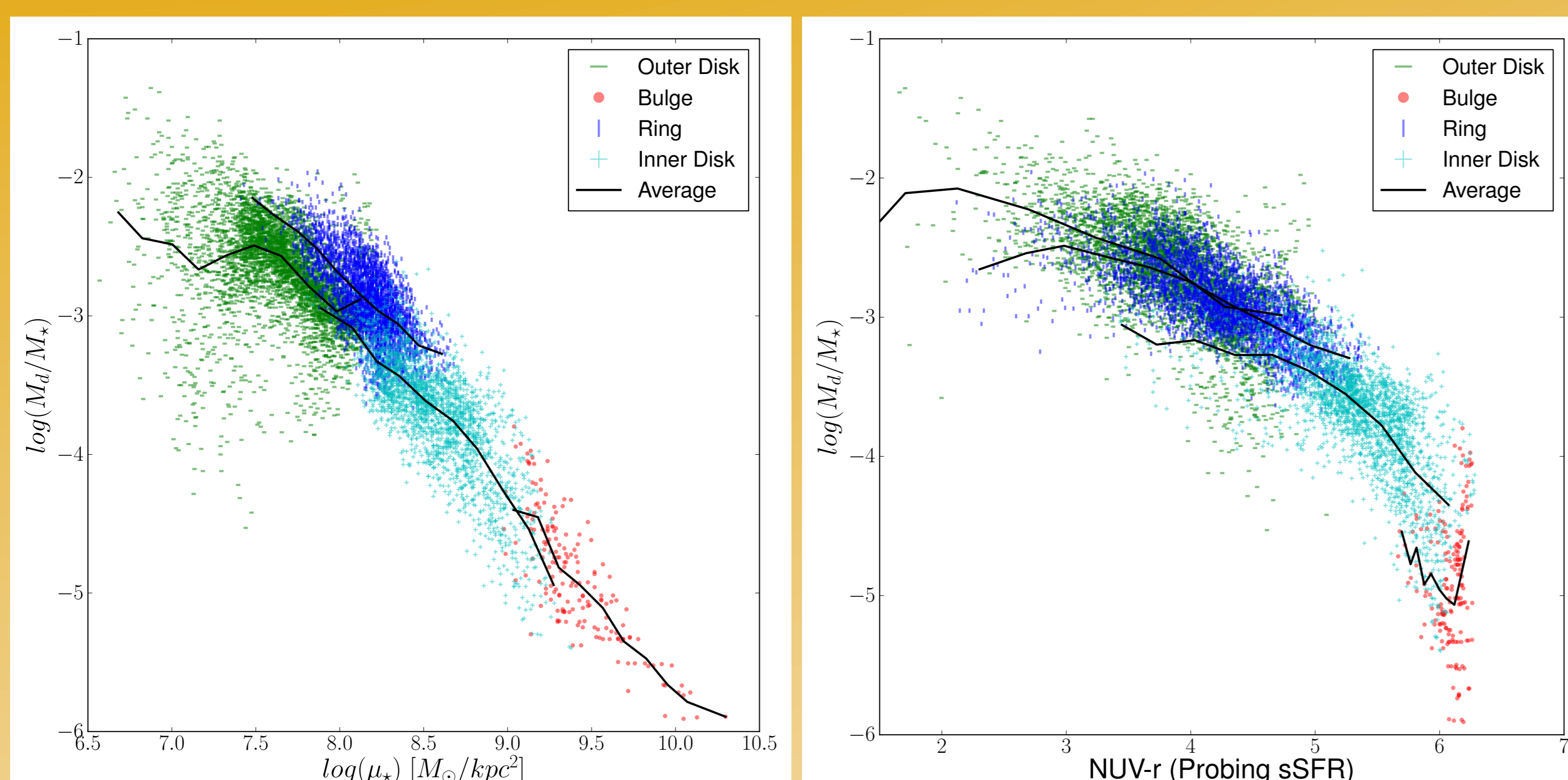
PARAMETER MAPS



SCALING RELATIONS

Dust scaling relations probe the properties of the ISM relative to their environment, giving key insights into their interactions.

Cortese et al. 2012 investigated these trends on a galaxy-galaxy base using the Herschel Reference Survey and found clear evidence for a link between dust and the star formation history of galaxies. We investigate the same relations on a sub-galactic scale.



CONCLUSIONS

- The UV-to-FIR data currently available allows to carry out detailed investigations of local galaxies. Using SED fitting tools, we are able to map the distribution and properties of stars and dust together with the star formation history in a consistent way.

- We find strong correlations between the dust-to-stellar mass ratio and the stellar and star formation history tracers. Moreover, these relations are very similar compared to their galaxy scale counterparts, proving the local nature of the underlying processes.