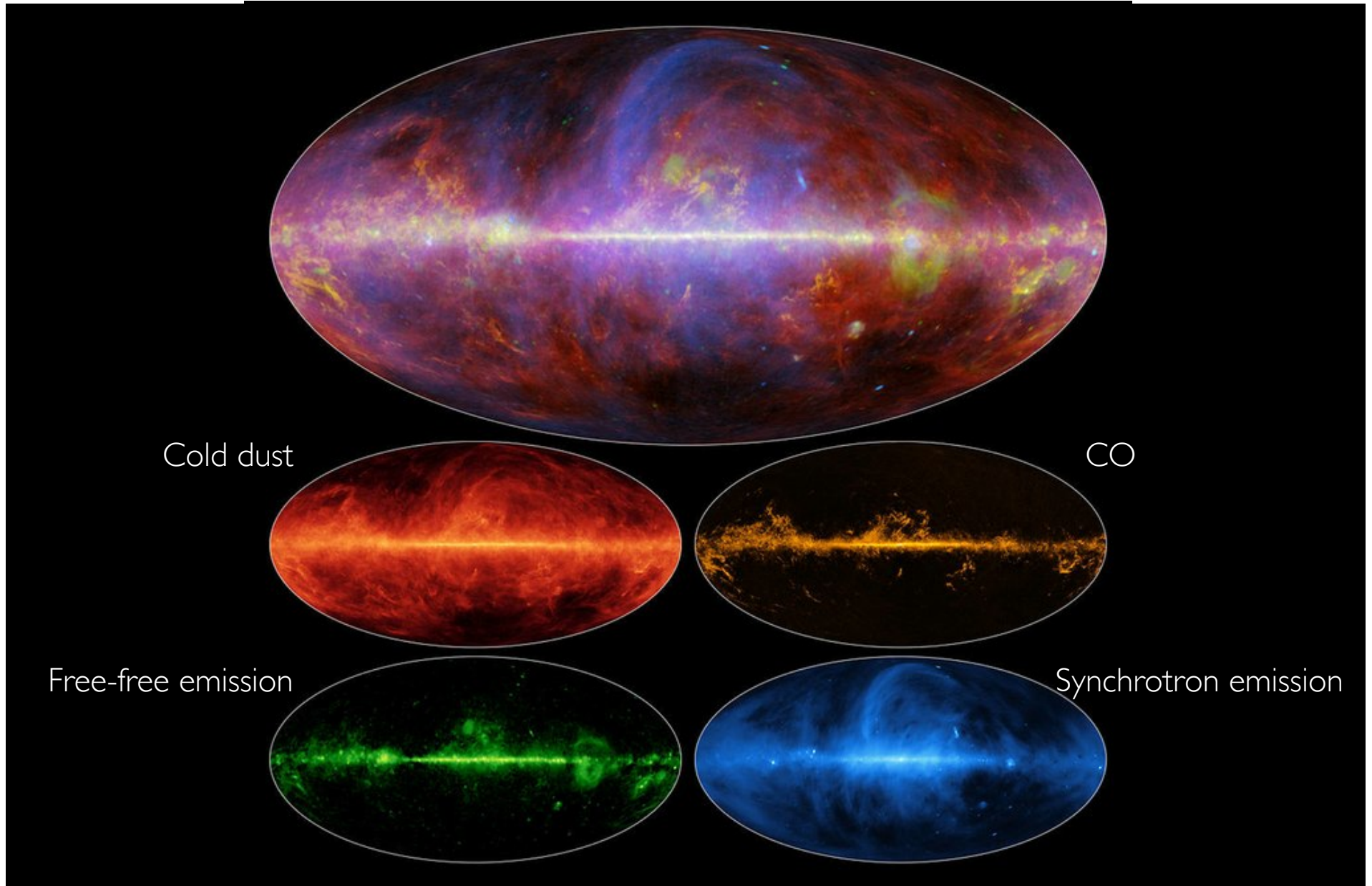




Galaxy Evolution & The High-Dimensional ISM

G. Zasowski
University of Utah

A Complex Interstellar Medium



atoms

small
molecules

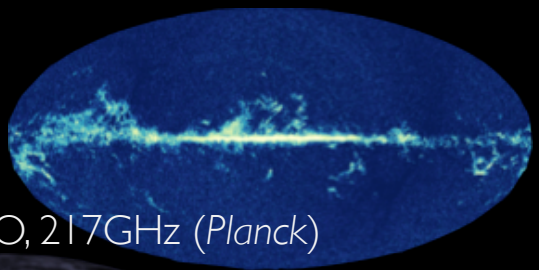
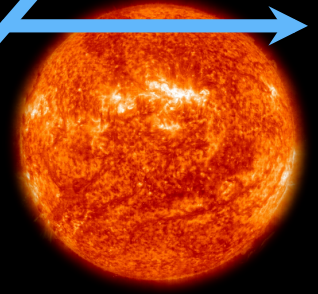
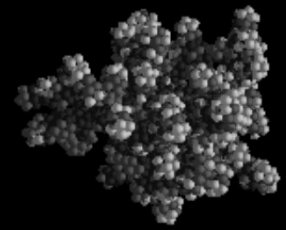
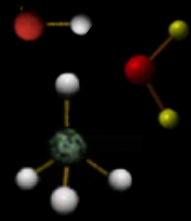
dust grains

stars

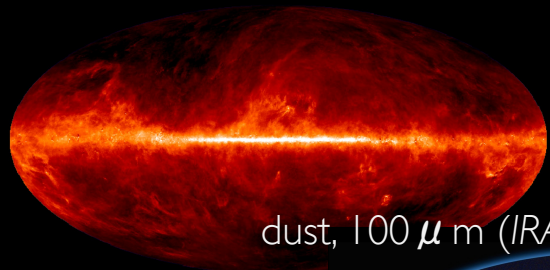
size



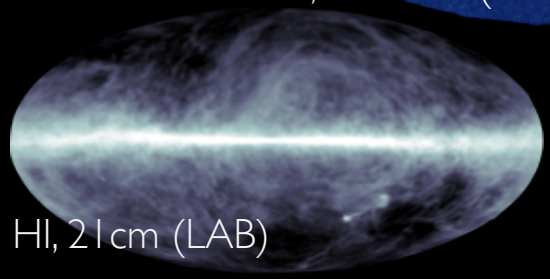
H



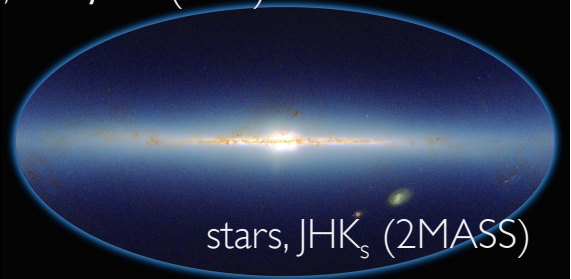
CO, 217GHz (*Planck*)



dust, 100 μ m (*IRAS*)



HI, 21 cm (*LAB*)



stars, JHK_s (*2MASS*)

atoms

small molecules

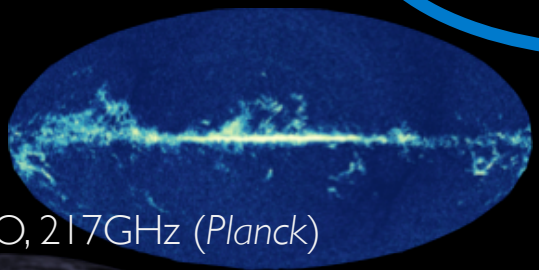
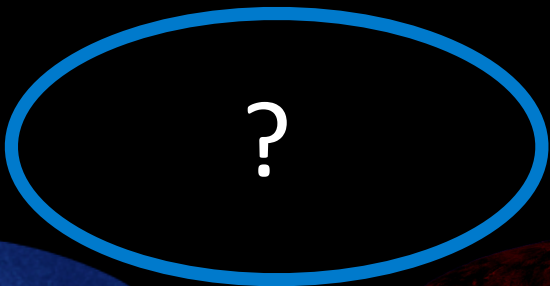
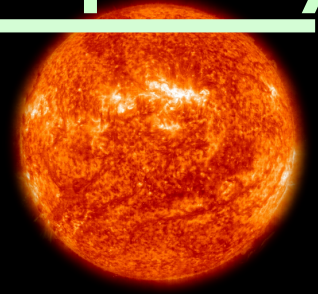
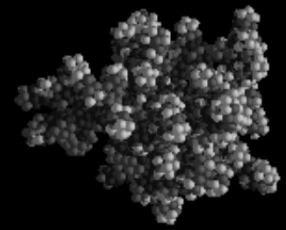
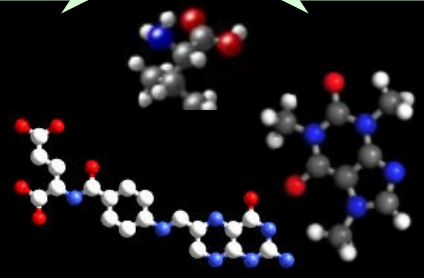
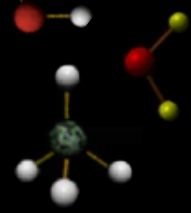
large molecules

dust grains

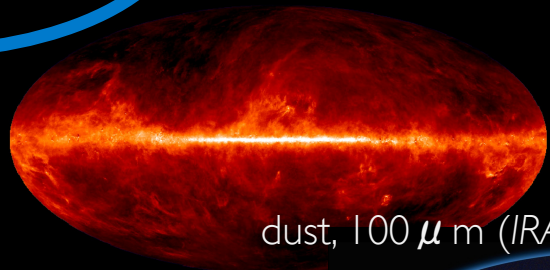
stars
complexity



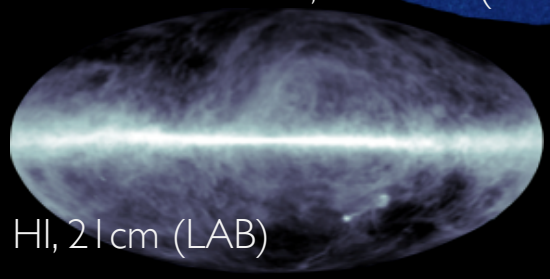
H



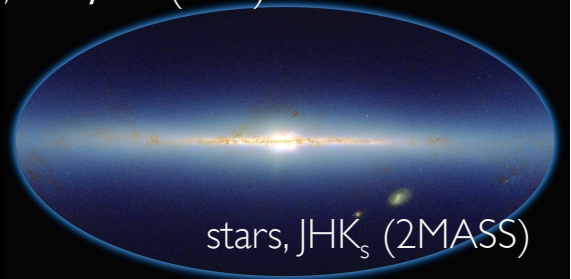
CO, 217GHz (*Planck*)



dust, 100 μ m (*IRAS*)

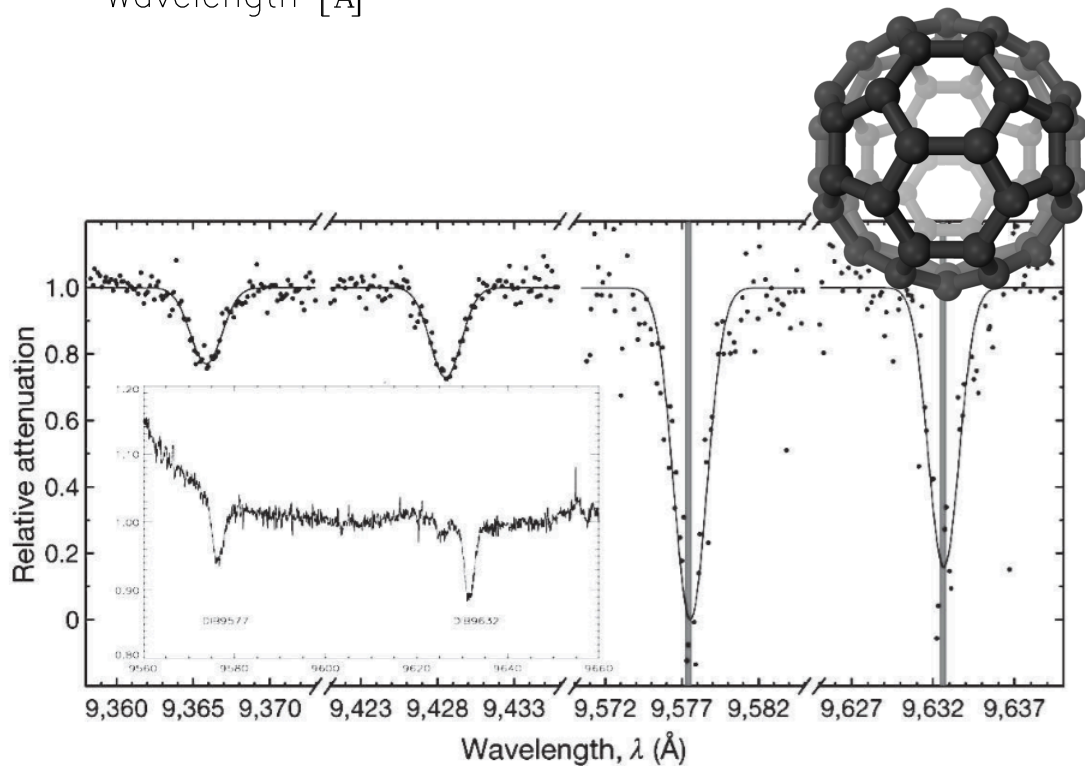
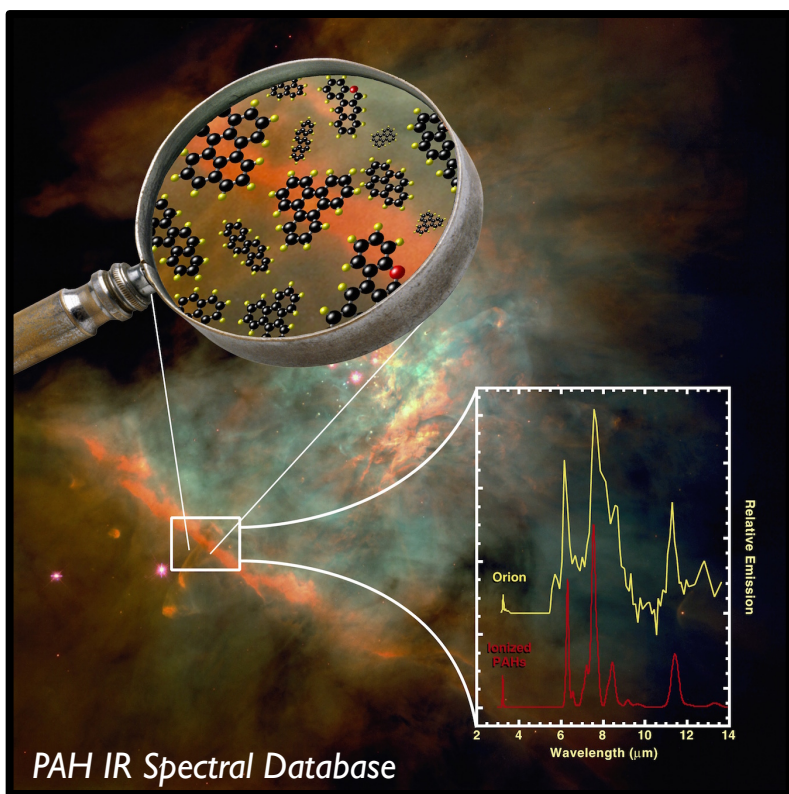
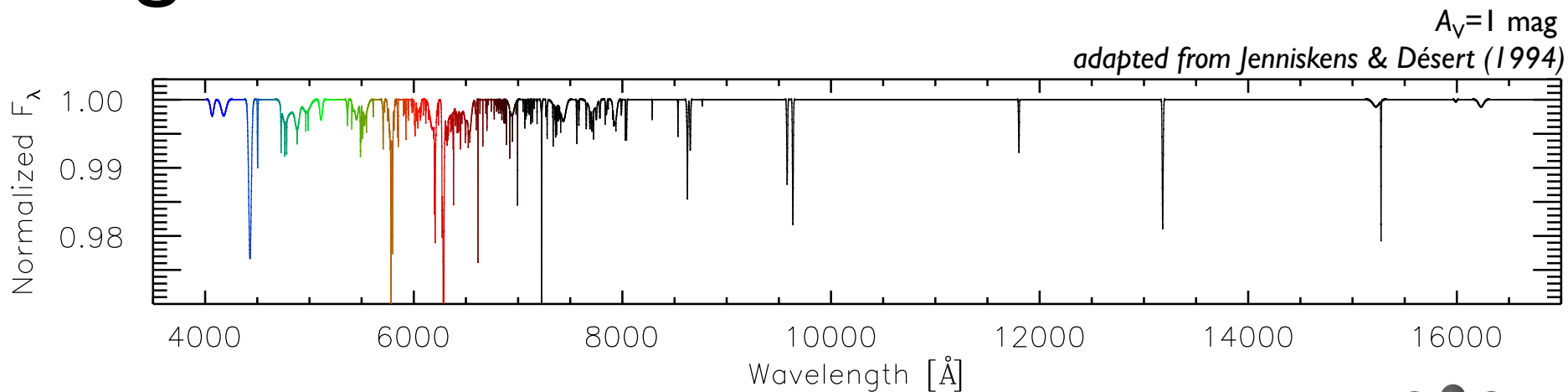


HI, 21cm (*LAB*)



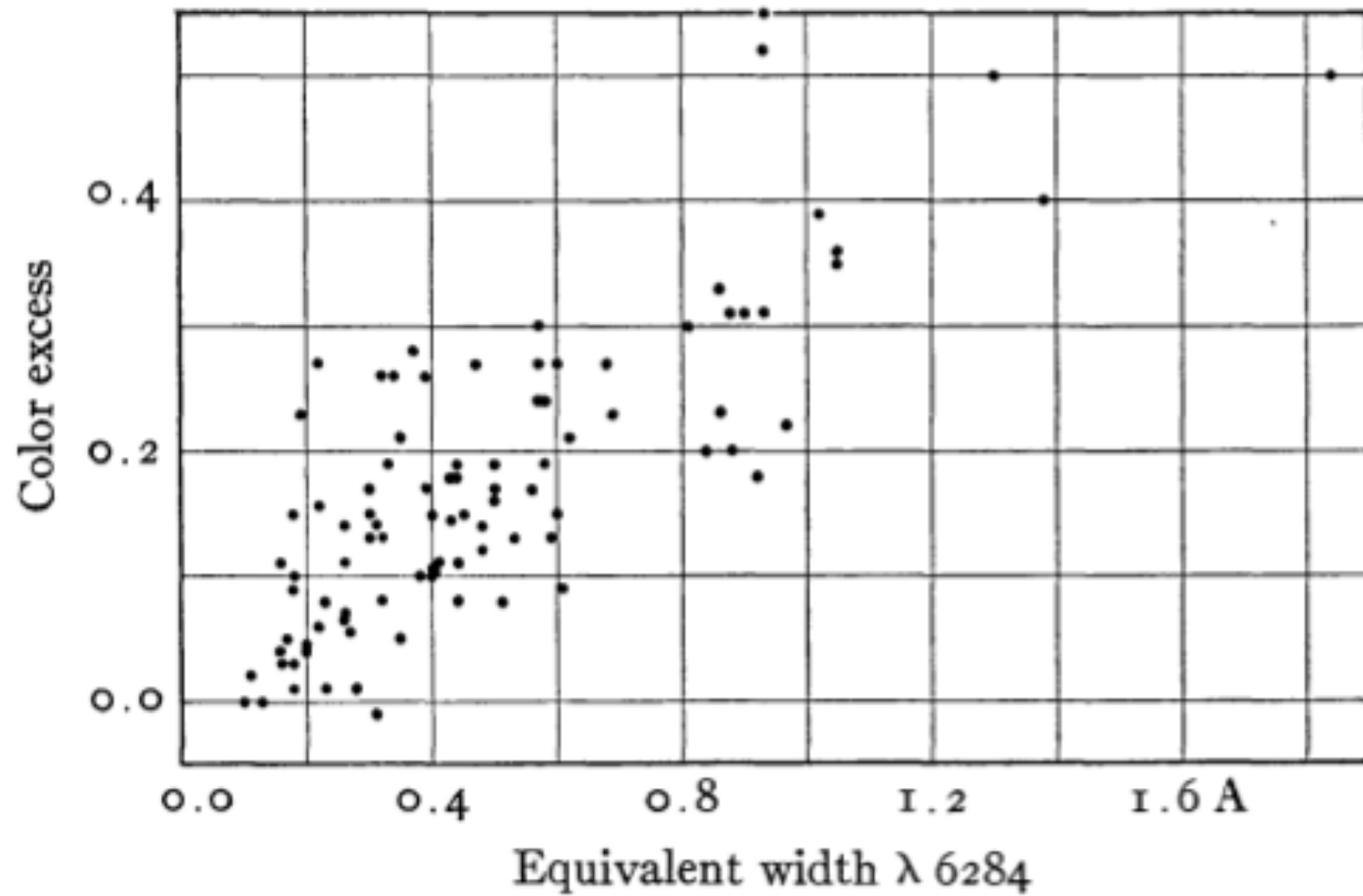
stars, JHK_s (*2MASS*)

Large Molecules \longleftrightarrow DIBs~~X~~

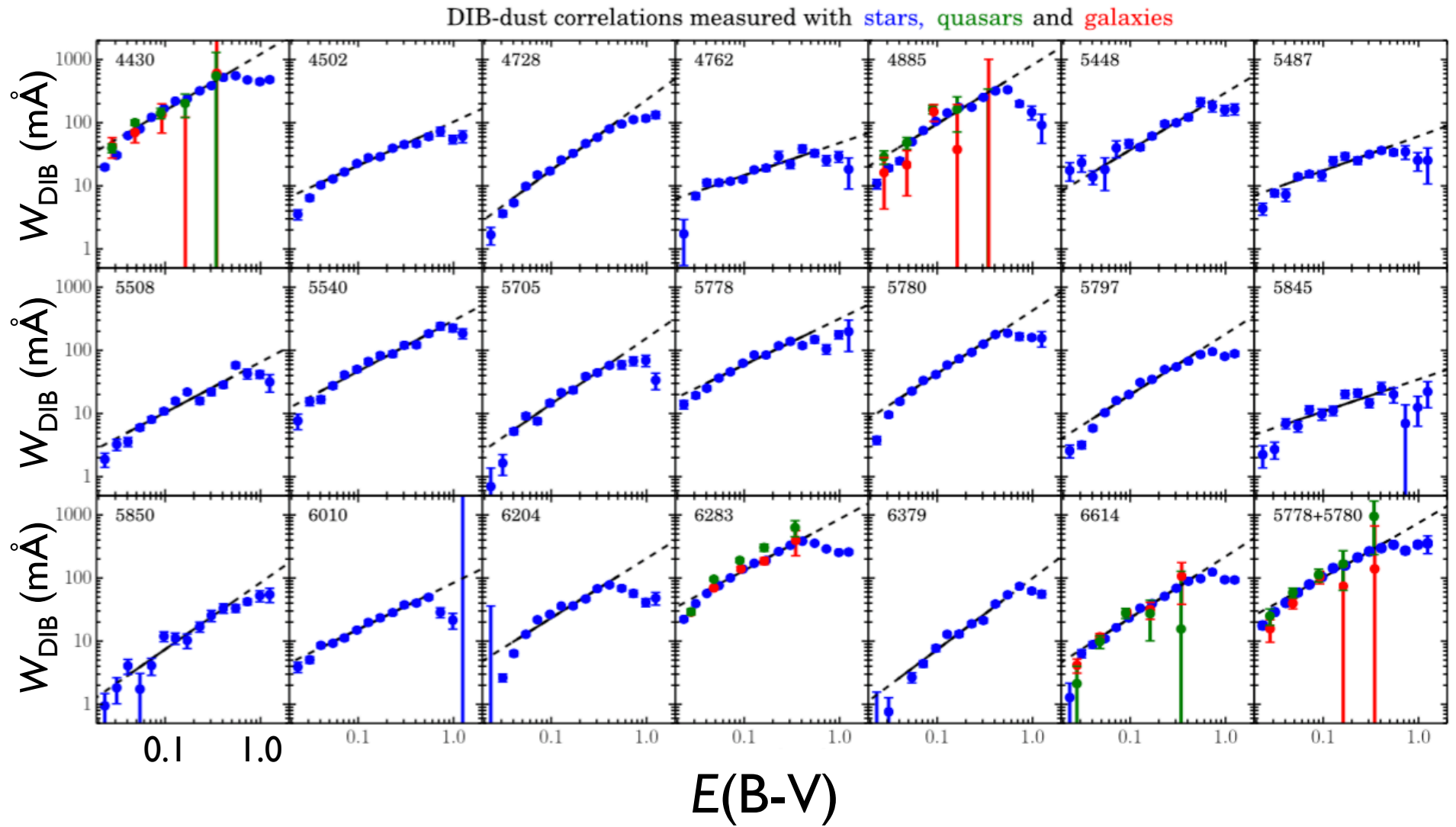


Campbell et al. (2015), Cordiner et al. (2019)

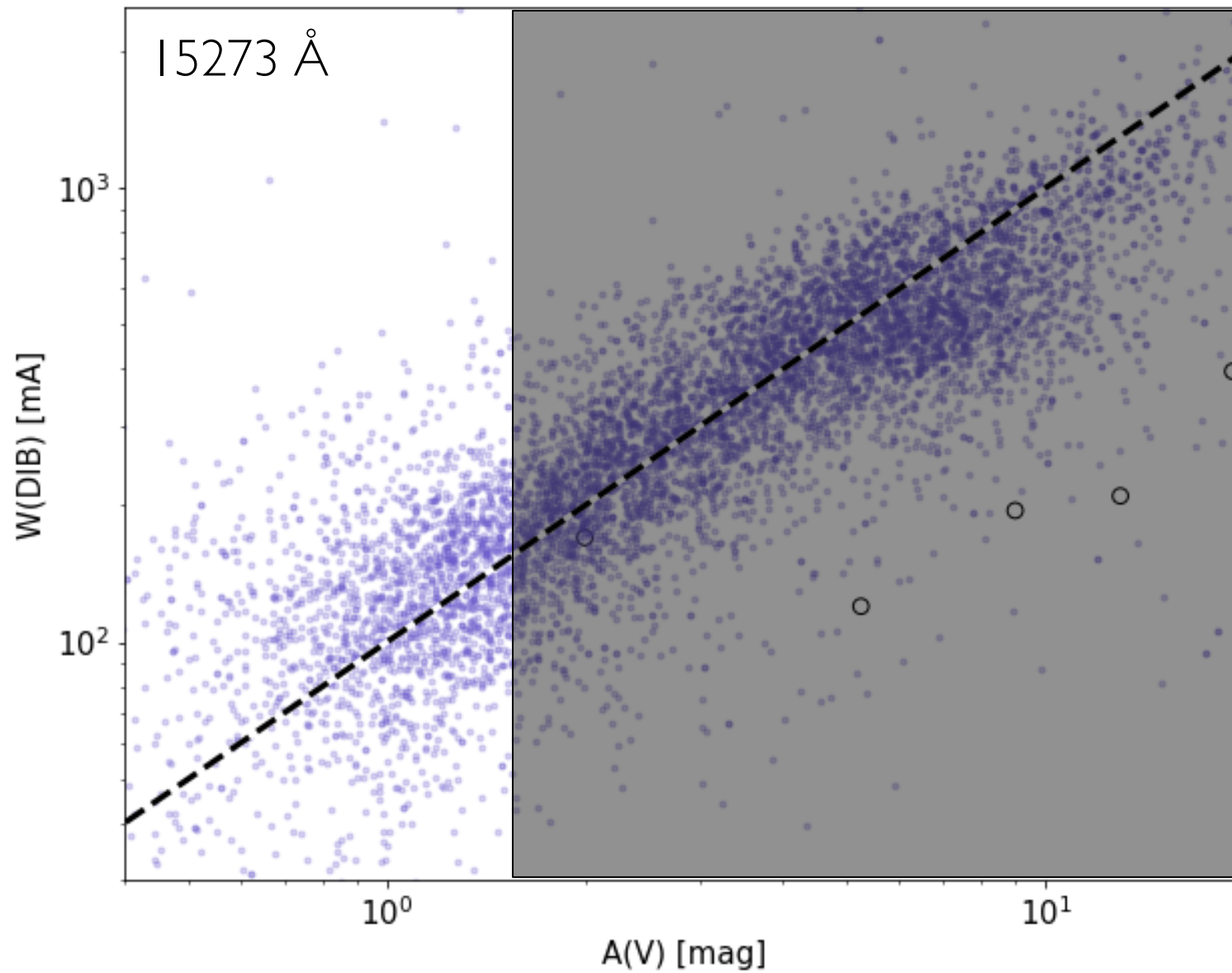
DIBs + Dust



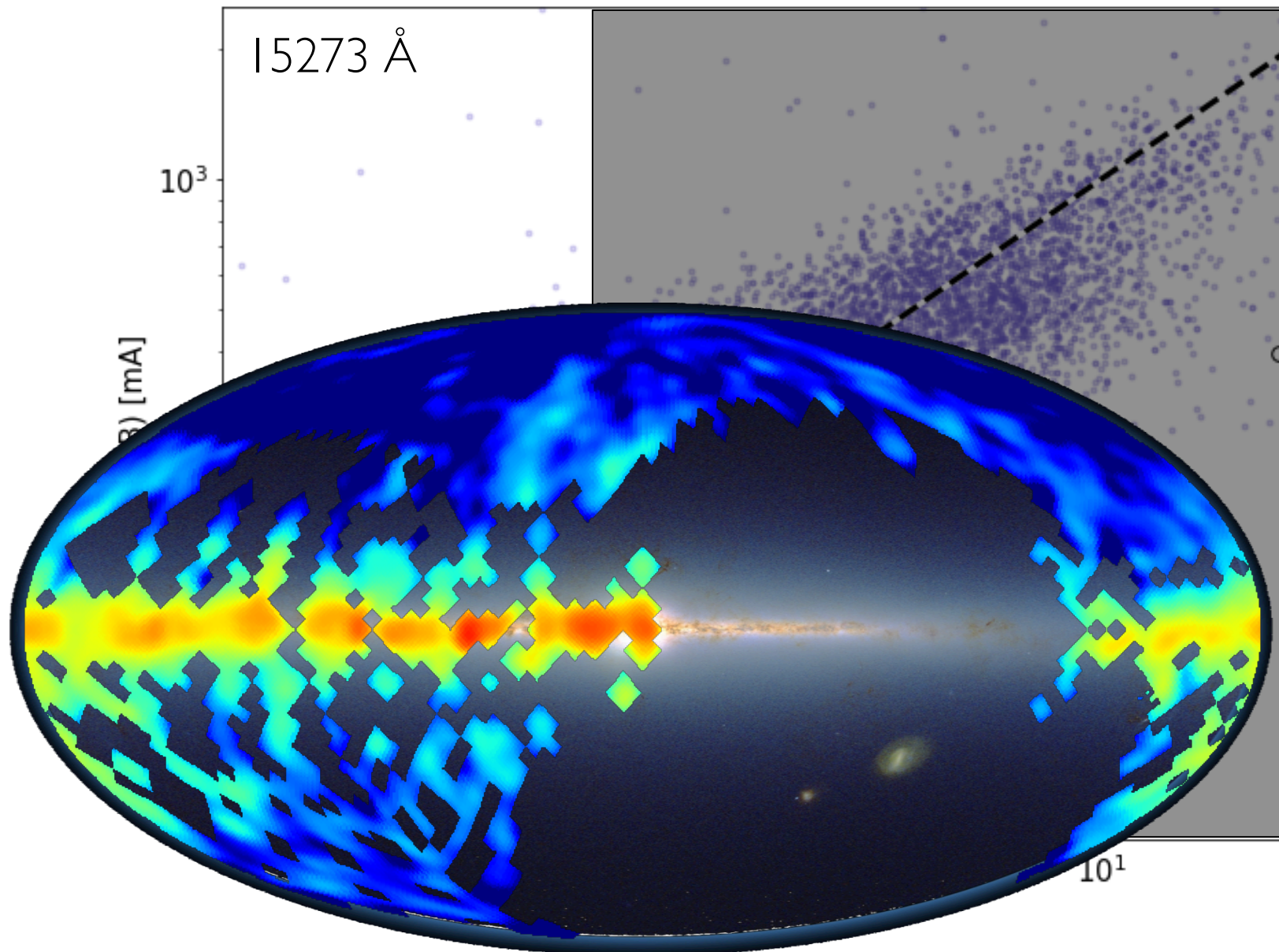
DIBs + Dust



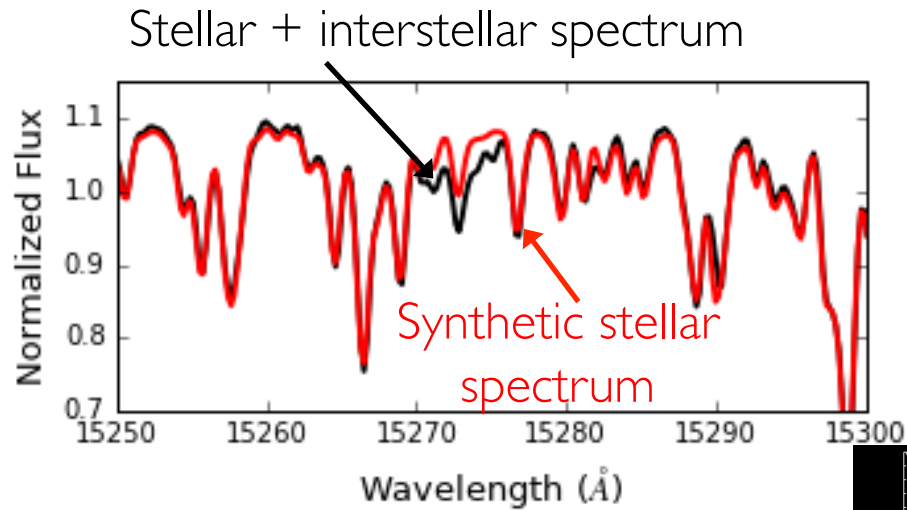
DIBs + Dust



DIBs + Dust



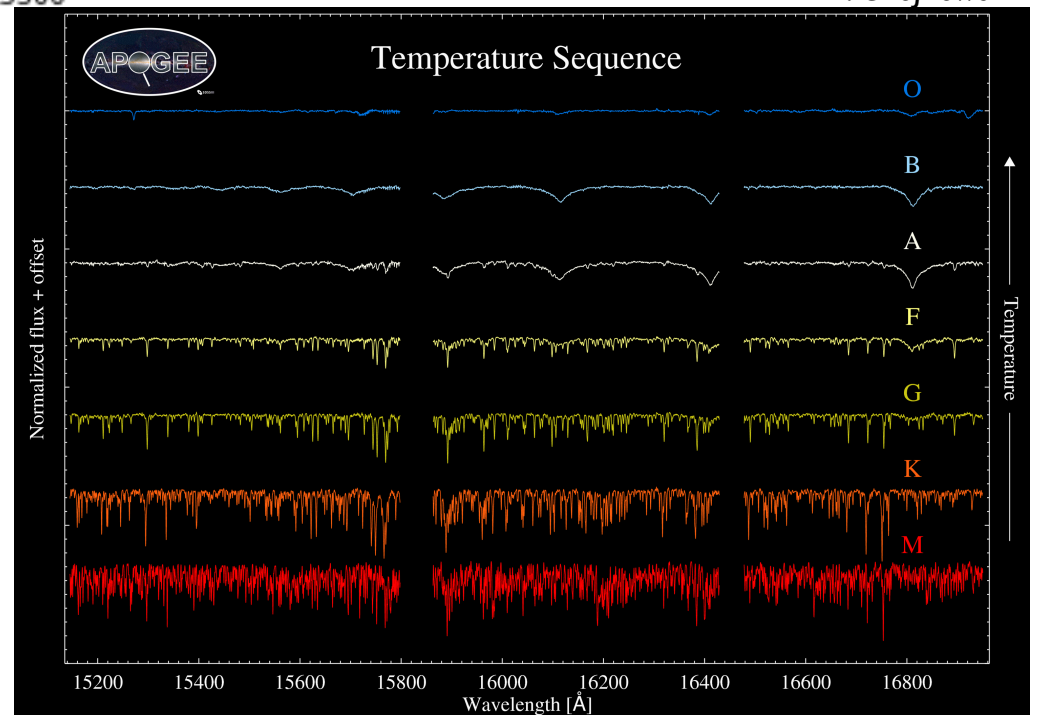
Extracting the $1.53\mu\text{m}$ DIB



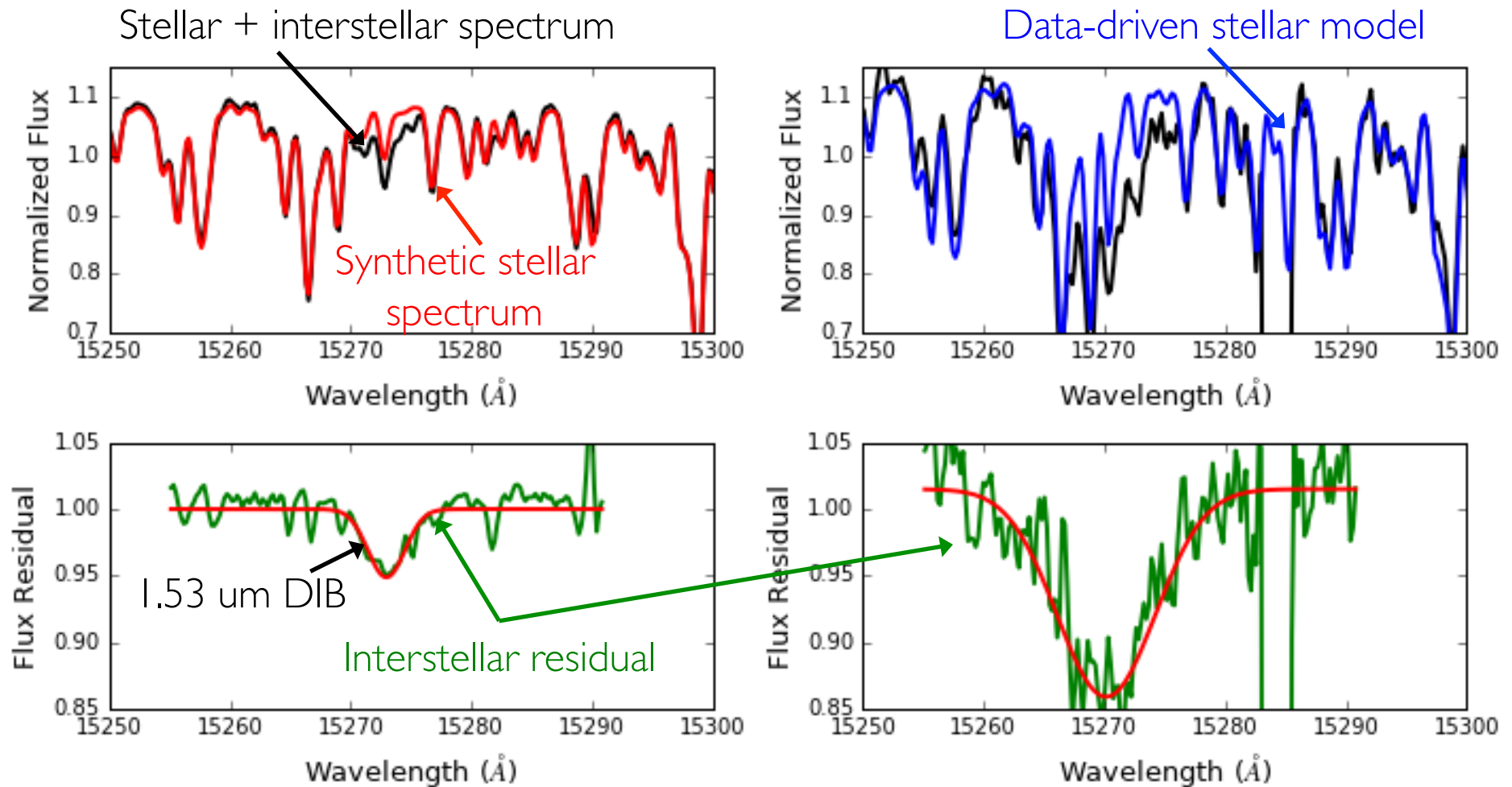
D. Chojnowski

Relatively easy to use these

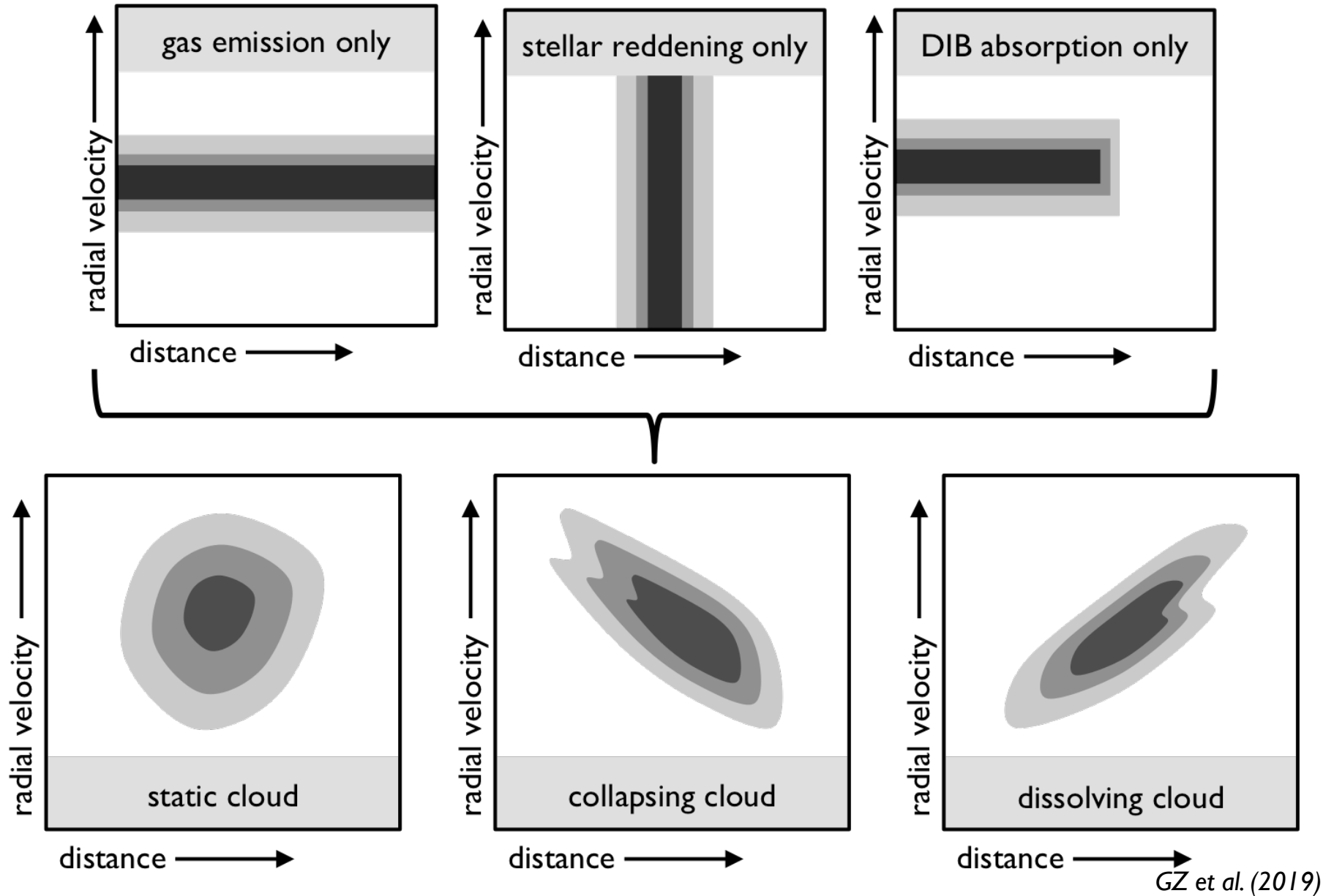
To probe large distances in the disk, need to use these



Extracting the 1.53 μm DIB



Galaxy Evolution via the 4-D ISM



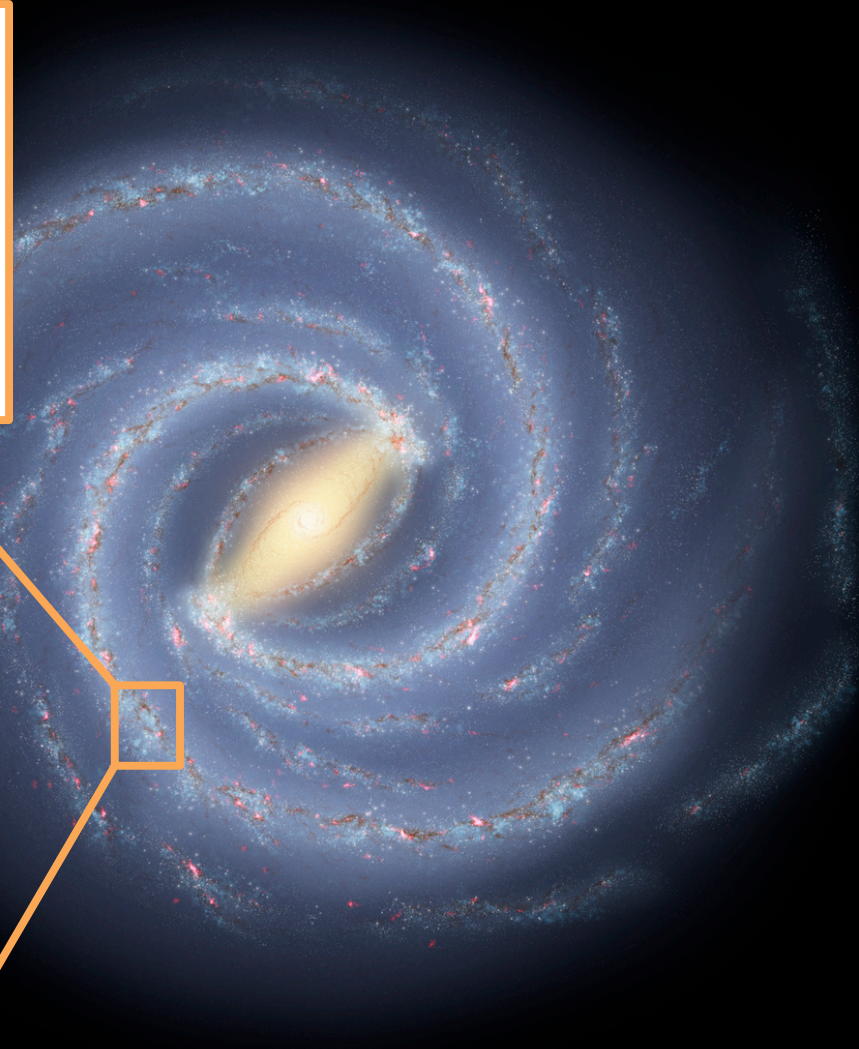
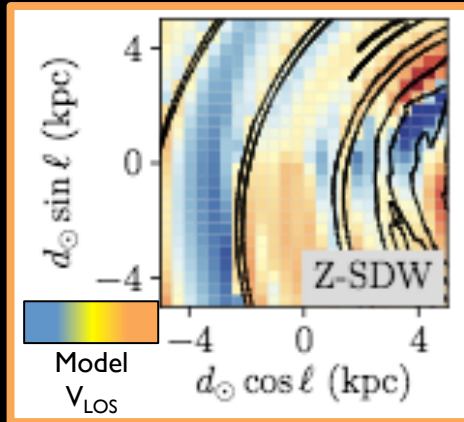
Galaxy Evolution via the 4-D ISM



R. Hurt / SSC-Caltech

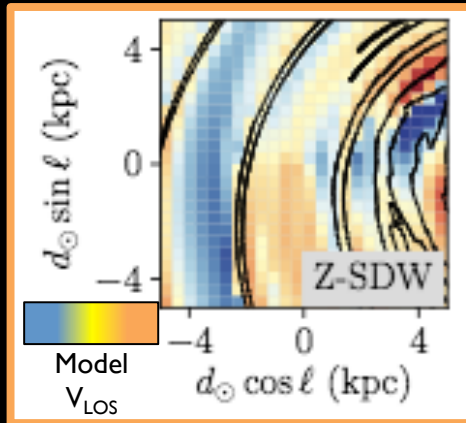
Galaxy Evolution via the 4-D ISM

What drives spiral arms?

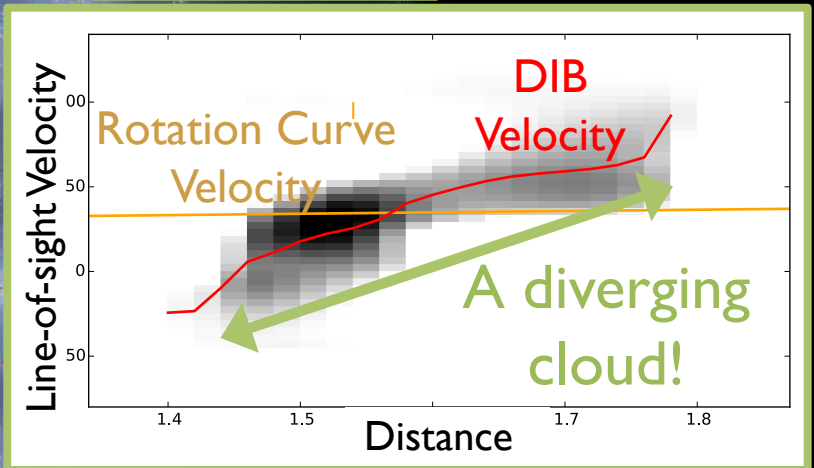
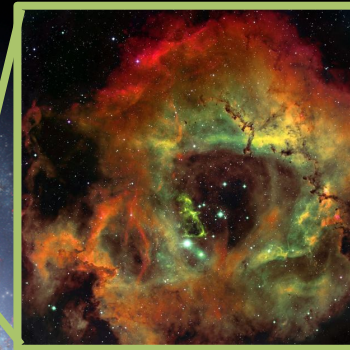


Galaxy Evolution via the 4-D ISM

What drives spiral arms?

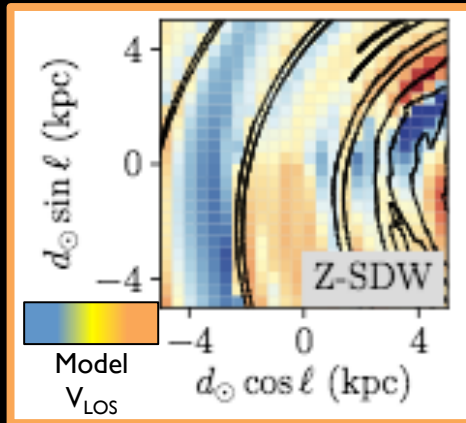


How do GMCs evolve?

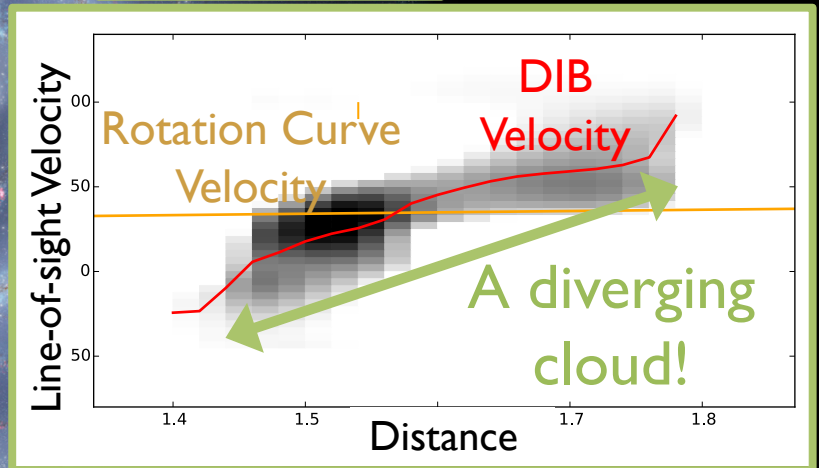
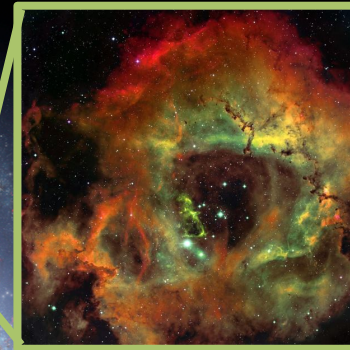


Galaxy Evolution via the 4-D ISM

What drives spiral arms?

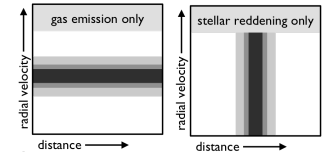


How do GMCs evolve?

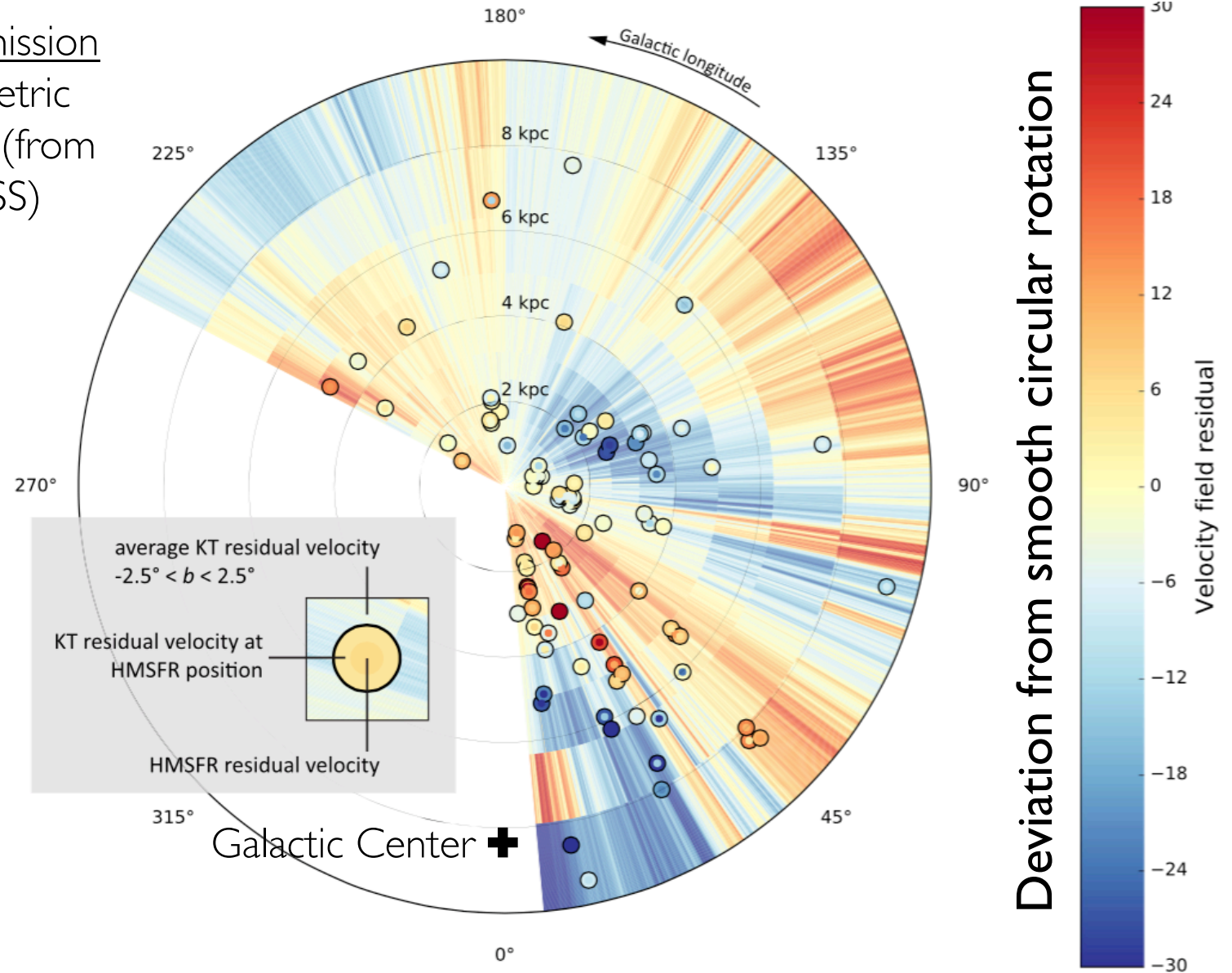


How does the ISM move around the Galaxy?

Case Study: Kinetic Tomography

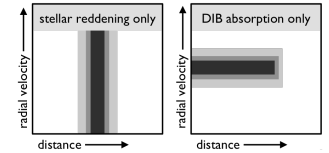


Using HI/CO emission
and 3D photometric
extinction maps (from
Panstarrs+2MASS)

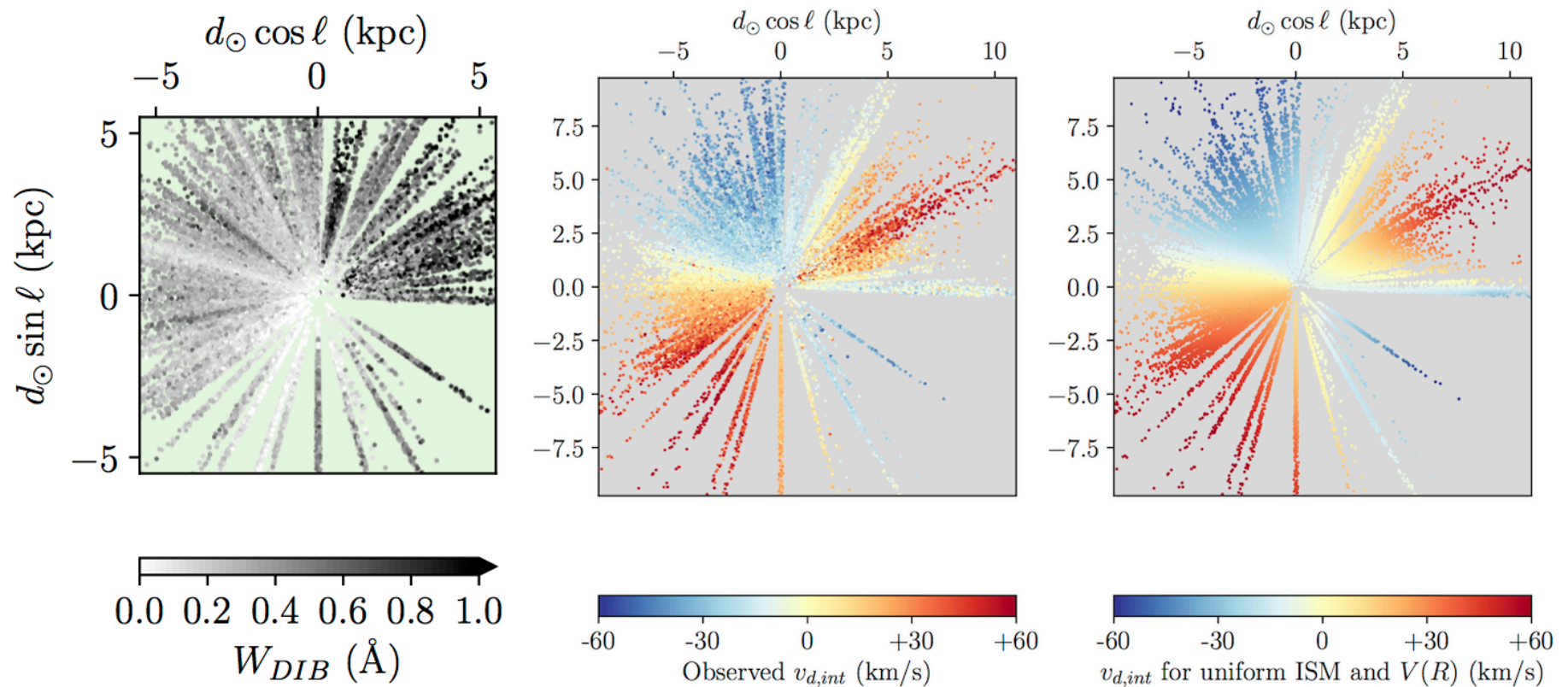


Tchernyshyov & Peek (2017)

Case Study: Kinetic Tomography



- Advantages to using absorption lines

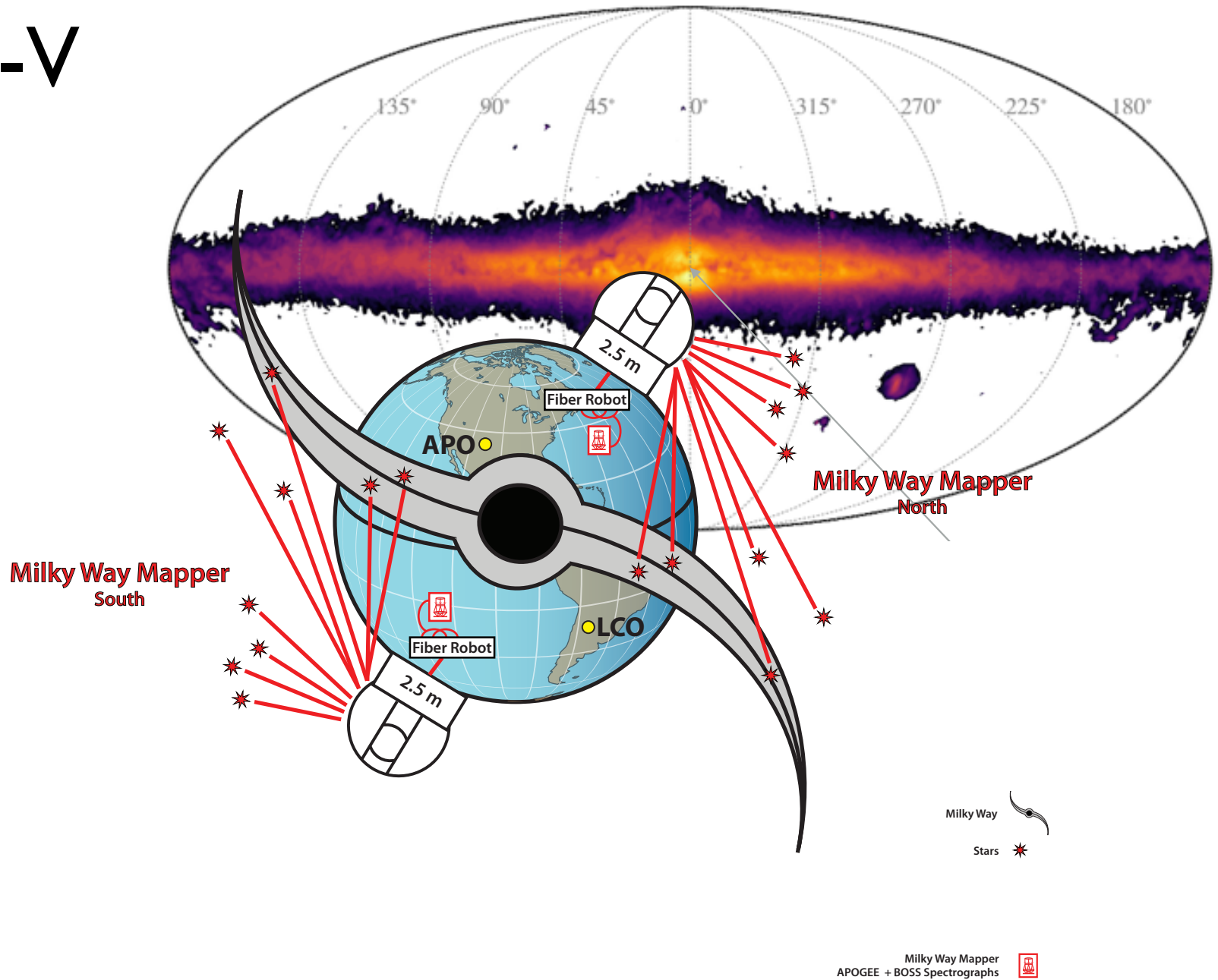


Quite new -- much to explore!

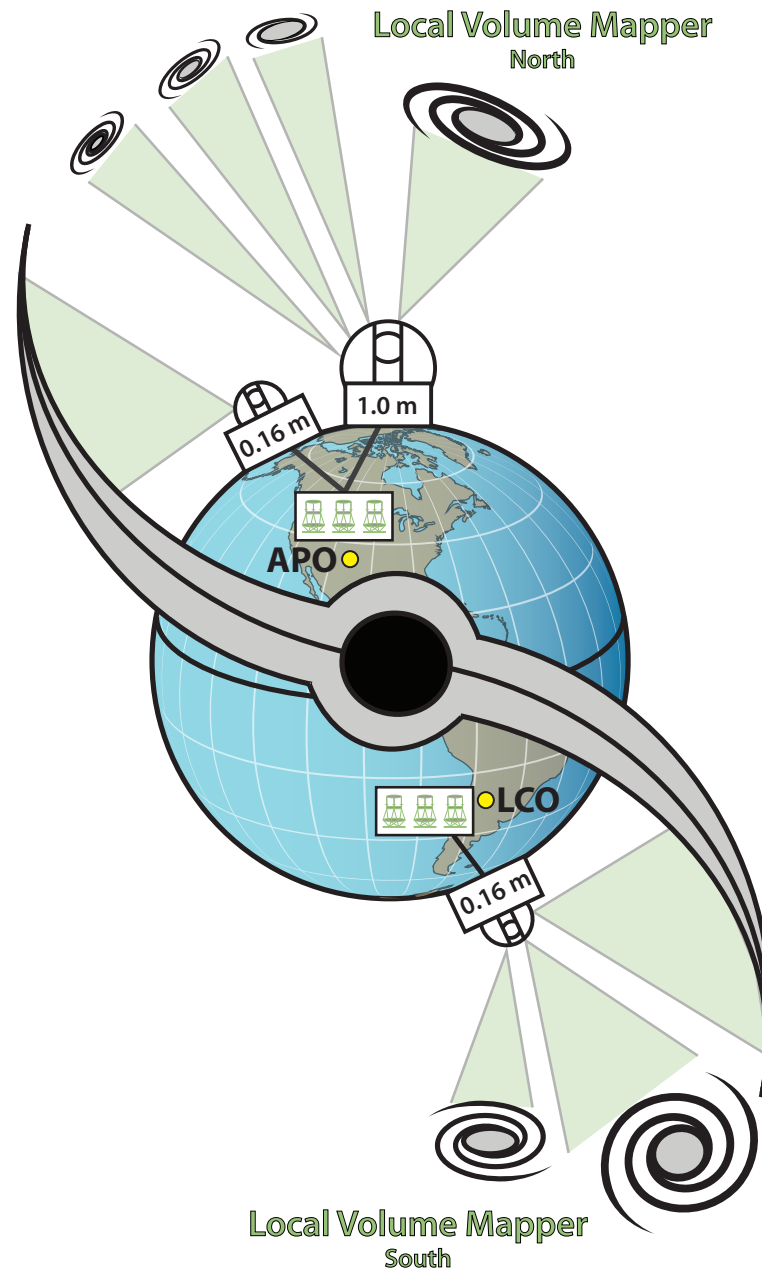
The Future is...Dark! (in a good way)

- Improved 3-D dust maps with *Gaia*
- $1.53\mu\text{m}$ DIBs along $\sim 5\text{M}$ sightlines with SDSS-V

SDSS-V



SDSS-V



<http://www.sdss.org/future/>

Local Volume Mapper
Integral Field Spectrograph 

M. Seibert

SDSS-V

Local Volume Mapper
North



100 pc/pixel

50 pc/pixel

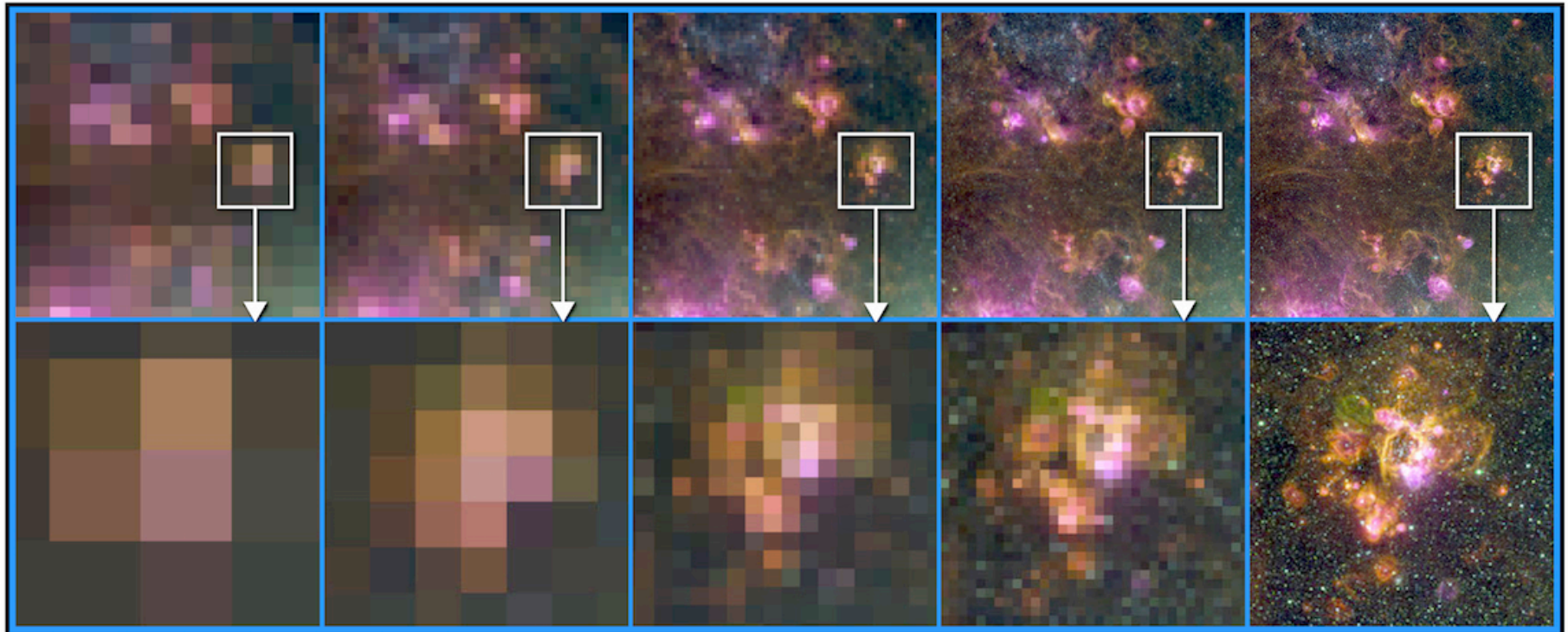
25 pc/pixel

10 pc/pixel


1.6 pc/pixel

1.4² sq. kpc

320² sq. pc

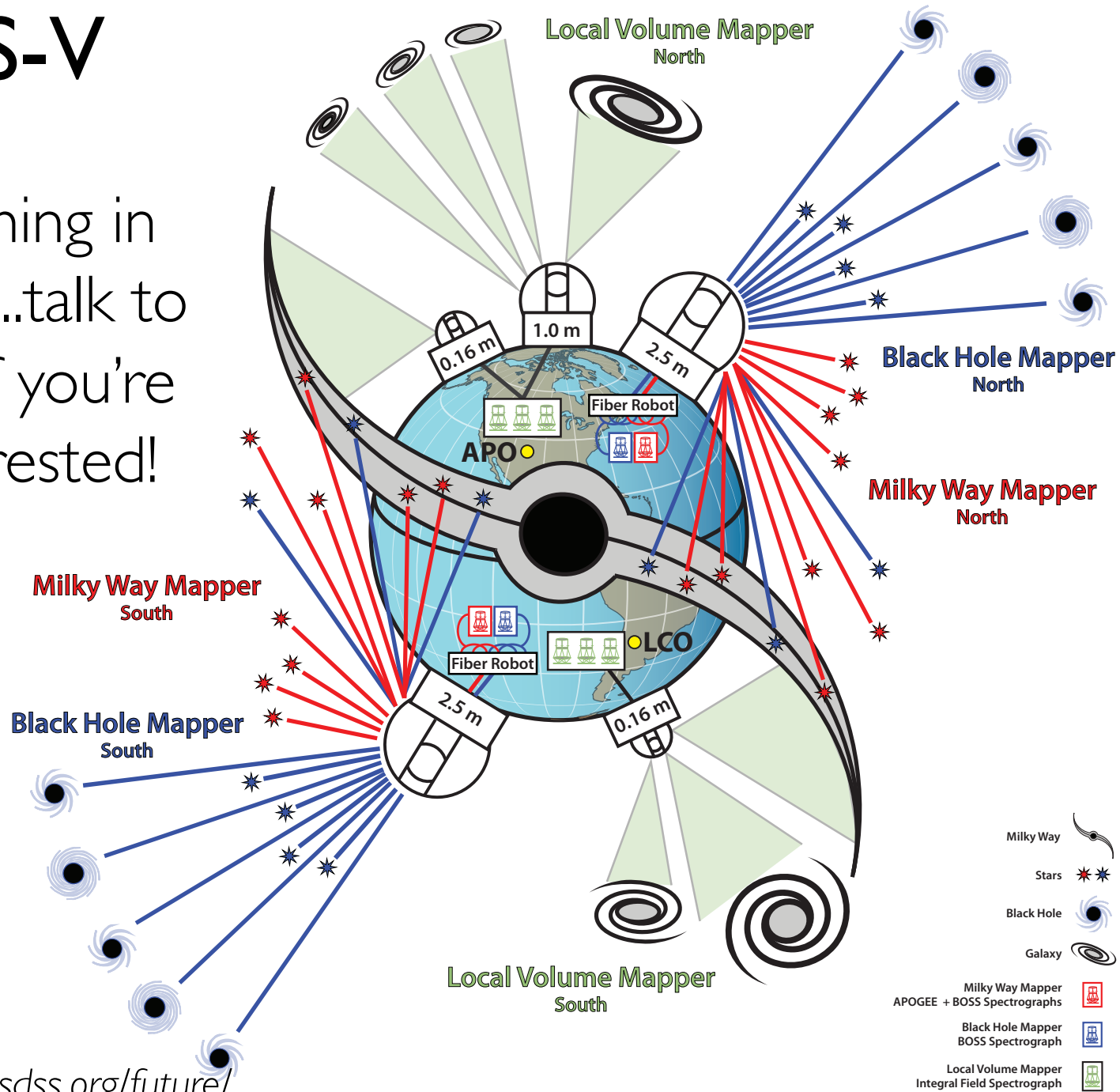


Local Volume Mapper
South

Galaxy 

SDSS-V

Coming in
2020...talk to
me if you're
interested!



<http://www.sdss.org/future/>

M. Seibert

Thank You

