

SMASH

Survey of the Magellanic Stellar History

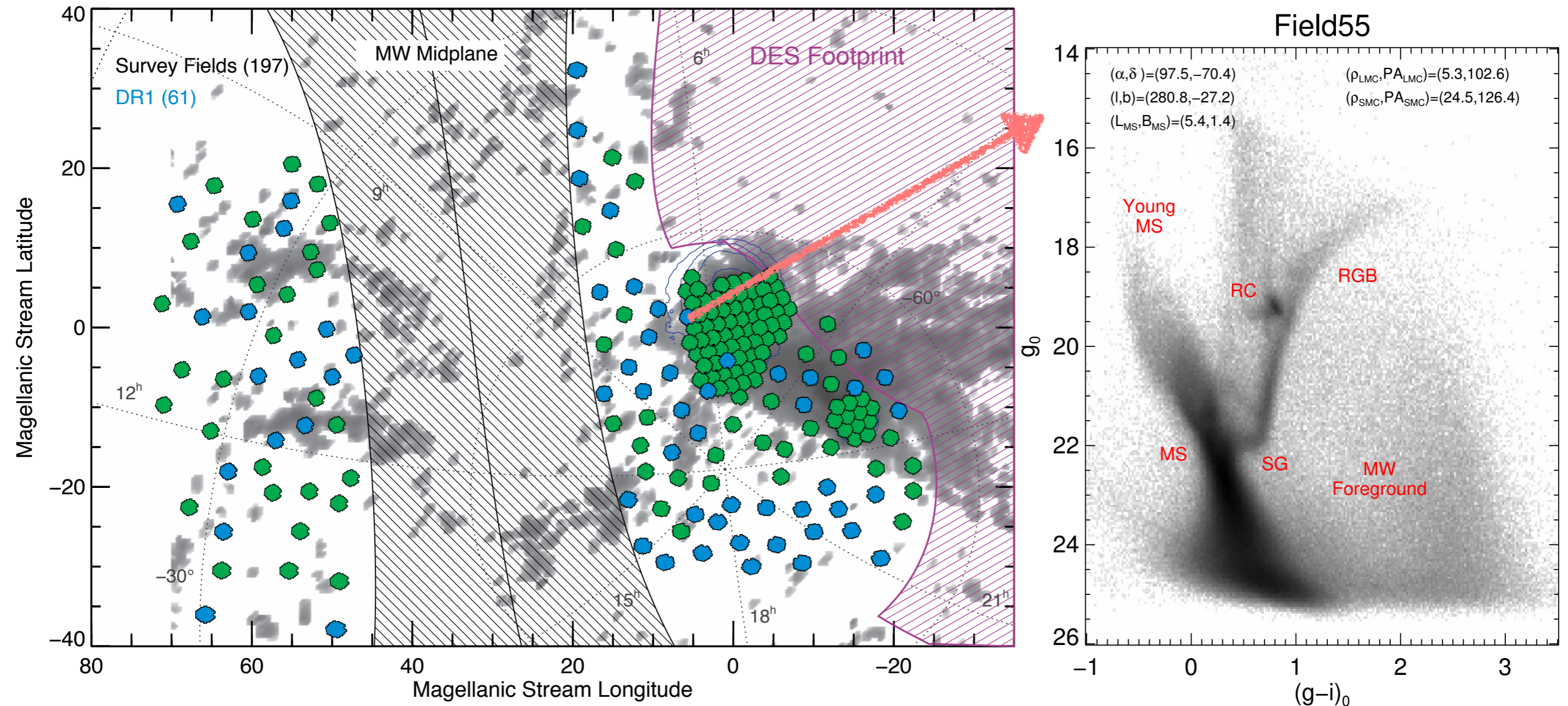
SMASHing the Magellanic Clouds: Imprints of Tidal Interactions between the Clouds in their Galactic Structures

Yumi Choi,

David Nidever, Knut Olsen, and the SMASH team

SMASH

Survey of the Magellanic Stellar History



The Magellanic Clouds on the Sky

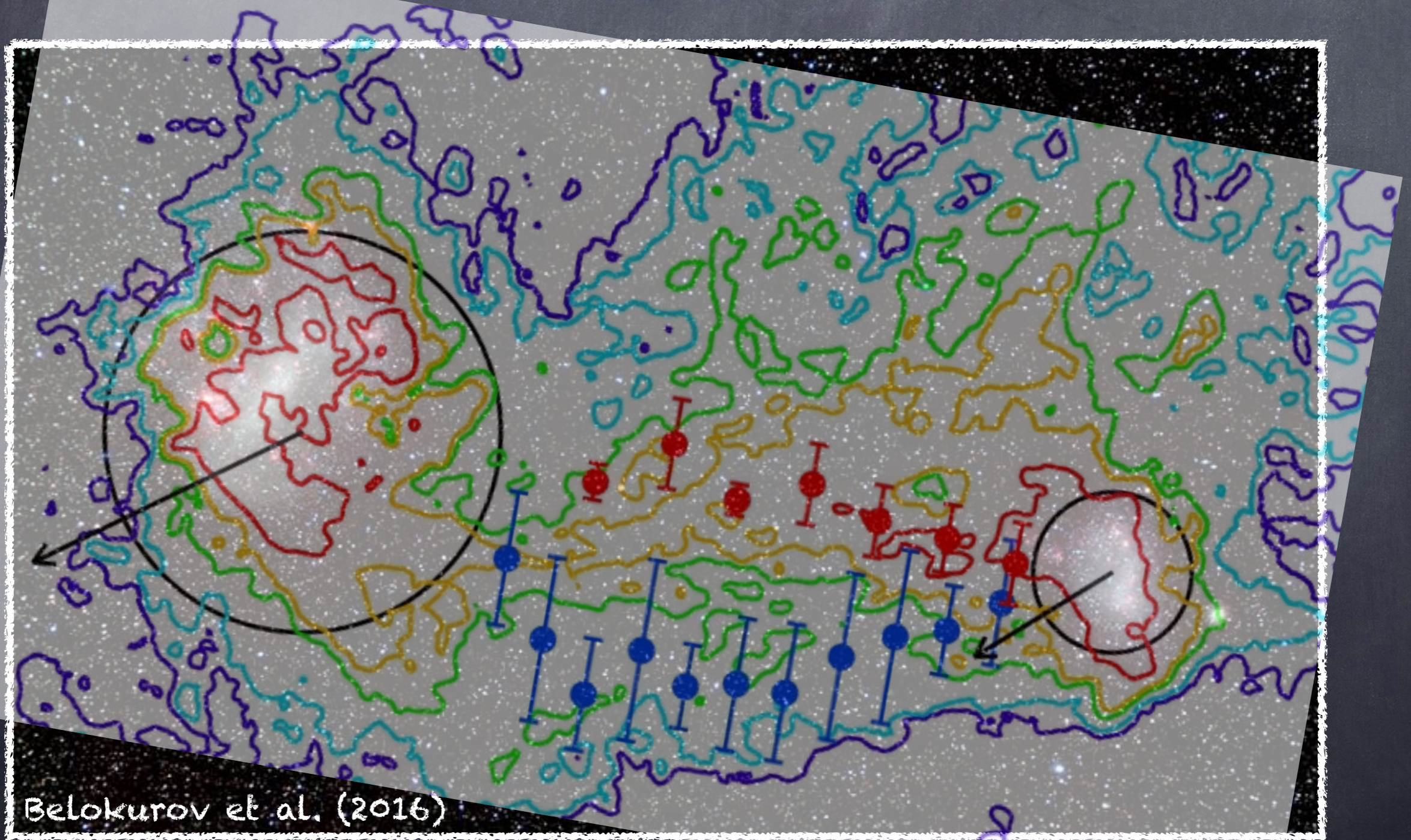
Large Magellanic Cloud

~50 kpc away

Small Magellanic Cloud

~60 kpc away

The Magellanic Clouds on the Sky



Belokurov et al. (2016)

What's new in the LMC Main Disk?

I. A new accurate dust reddening map

- 165 deg² area with ~10' resolution, publicly available

(ApJ or <https://galaxyumi.github.io/projects/SMASH>)

II. A new stellar warp toward the SMC & a tilted bar by 5-15 degrees

- evidence for the recent close LMC-SMC interaction

III. A ring-like stellar overdensity

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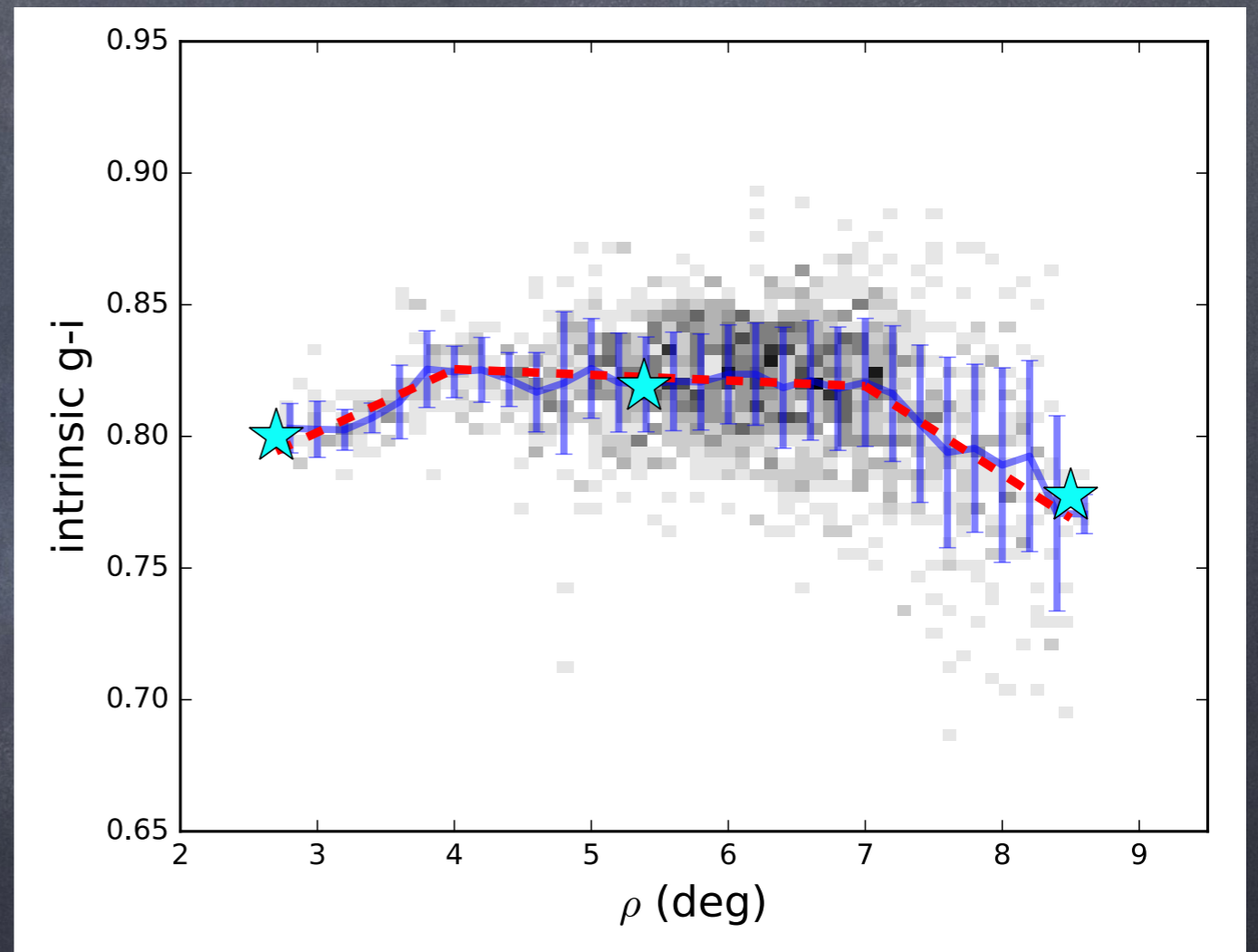
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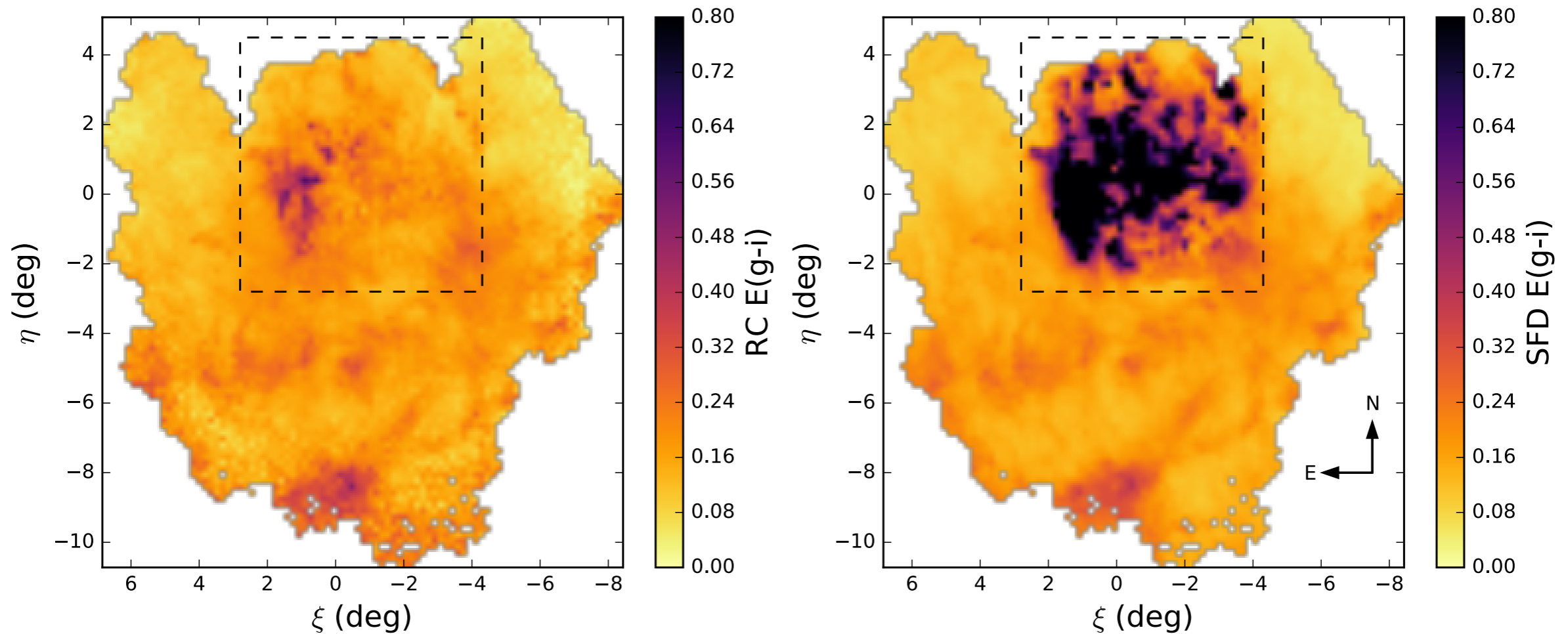
Intrinsic RC Color Radial Profile

- Consistent with the previously measured metallicity radial gradient and age-metallicity relation in the LMC (e.g., Piatti & Geisler (2013))



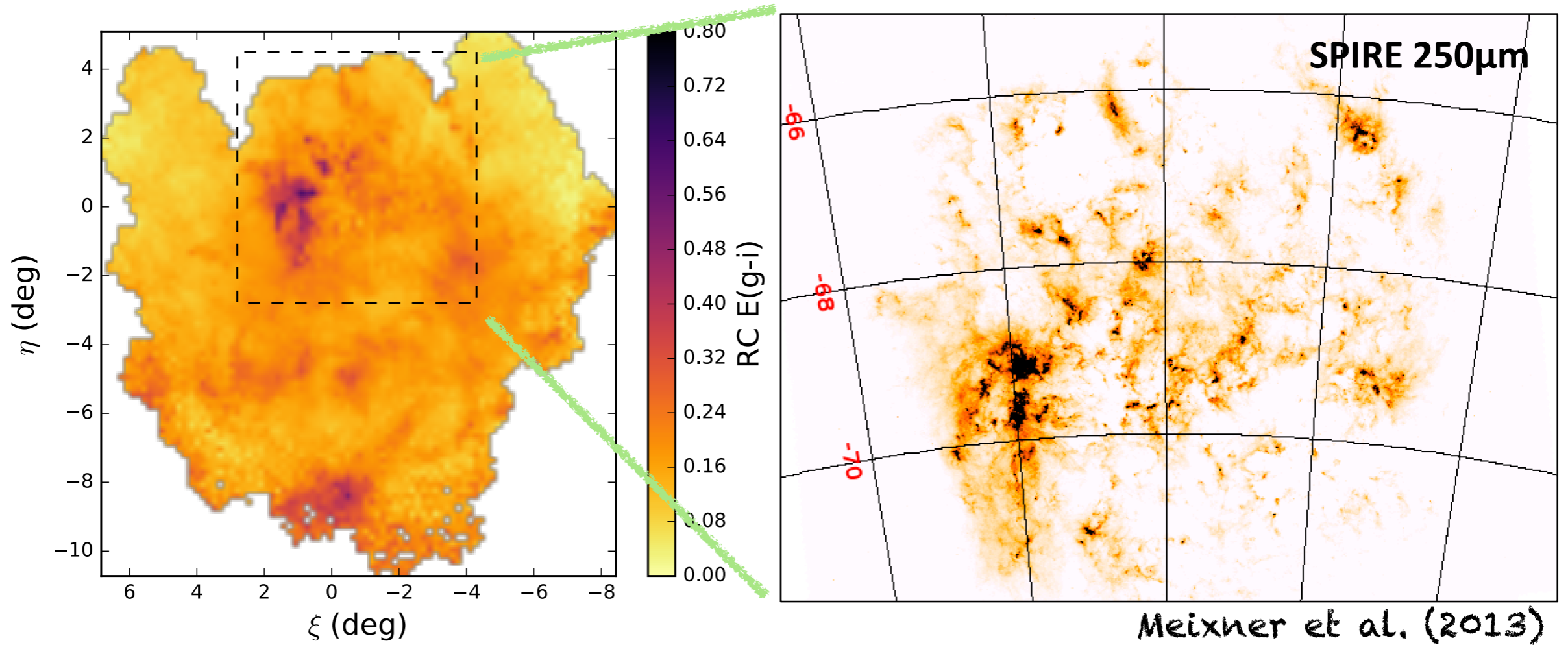
Choi et al. (2018a)

Inferred Reddening Map



Choi et al. (2018a)

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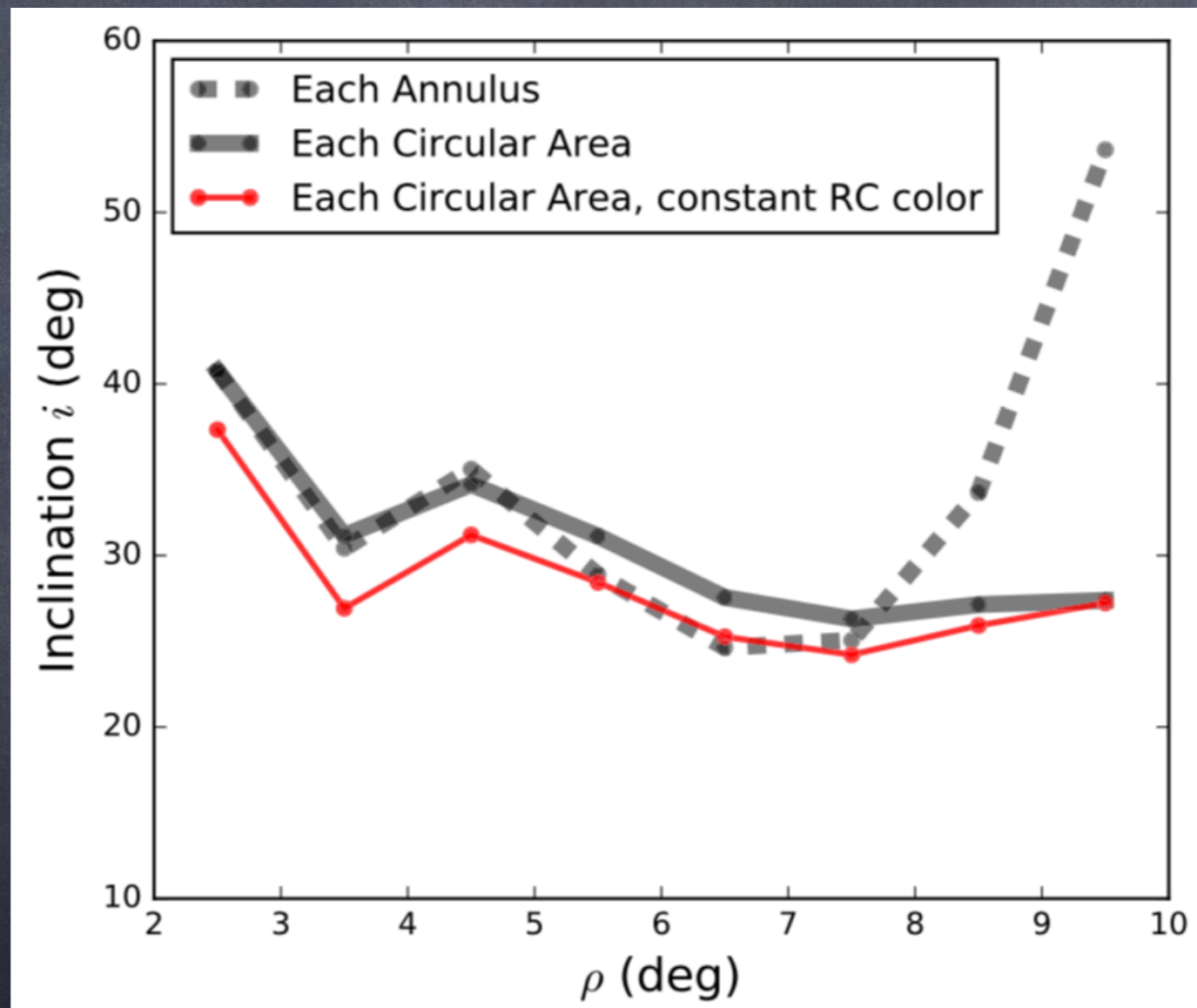
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Inclination Radial Profile

- Inclination vary with galactic radius, indicating a warped and twisted disk!

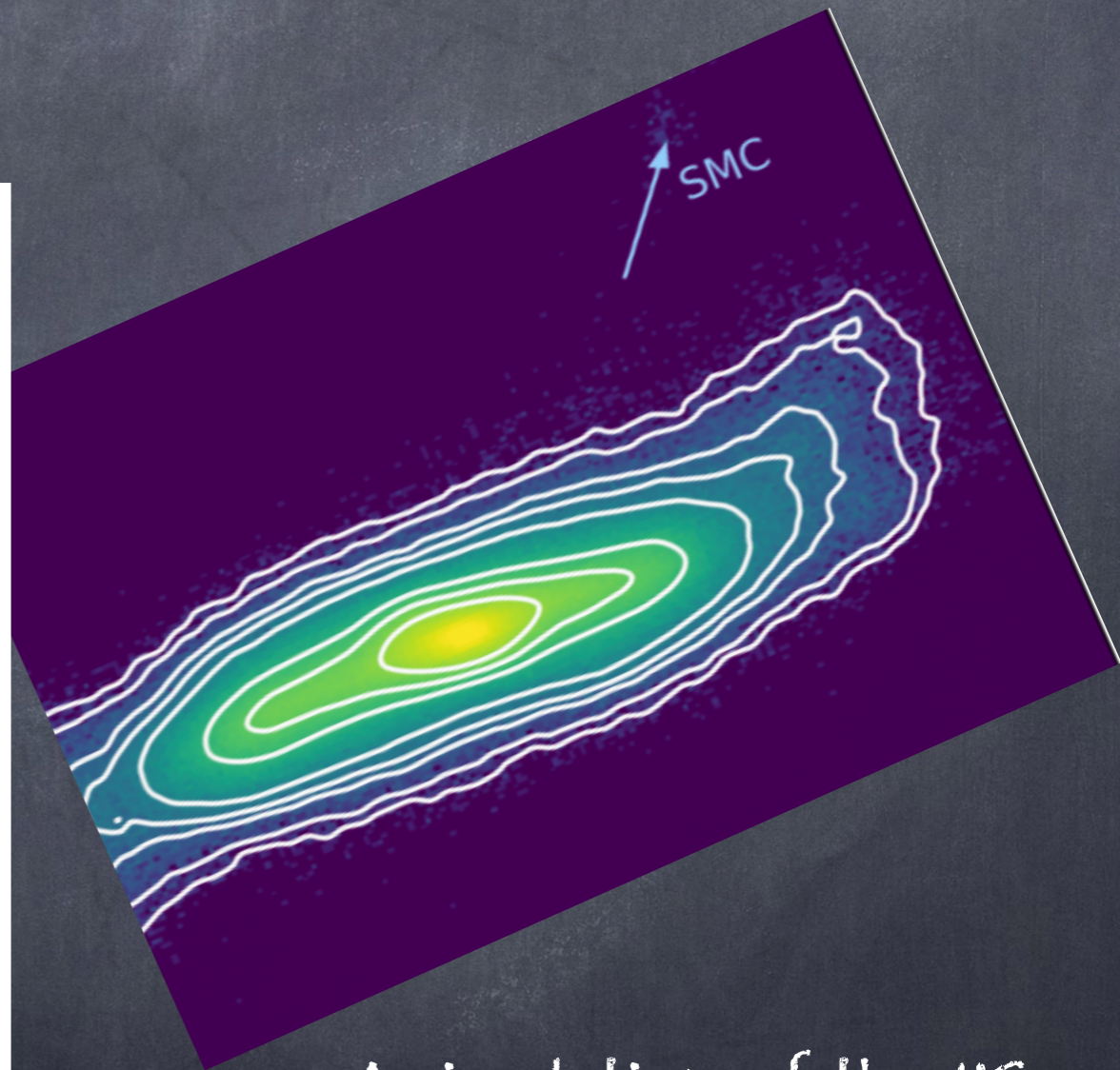
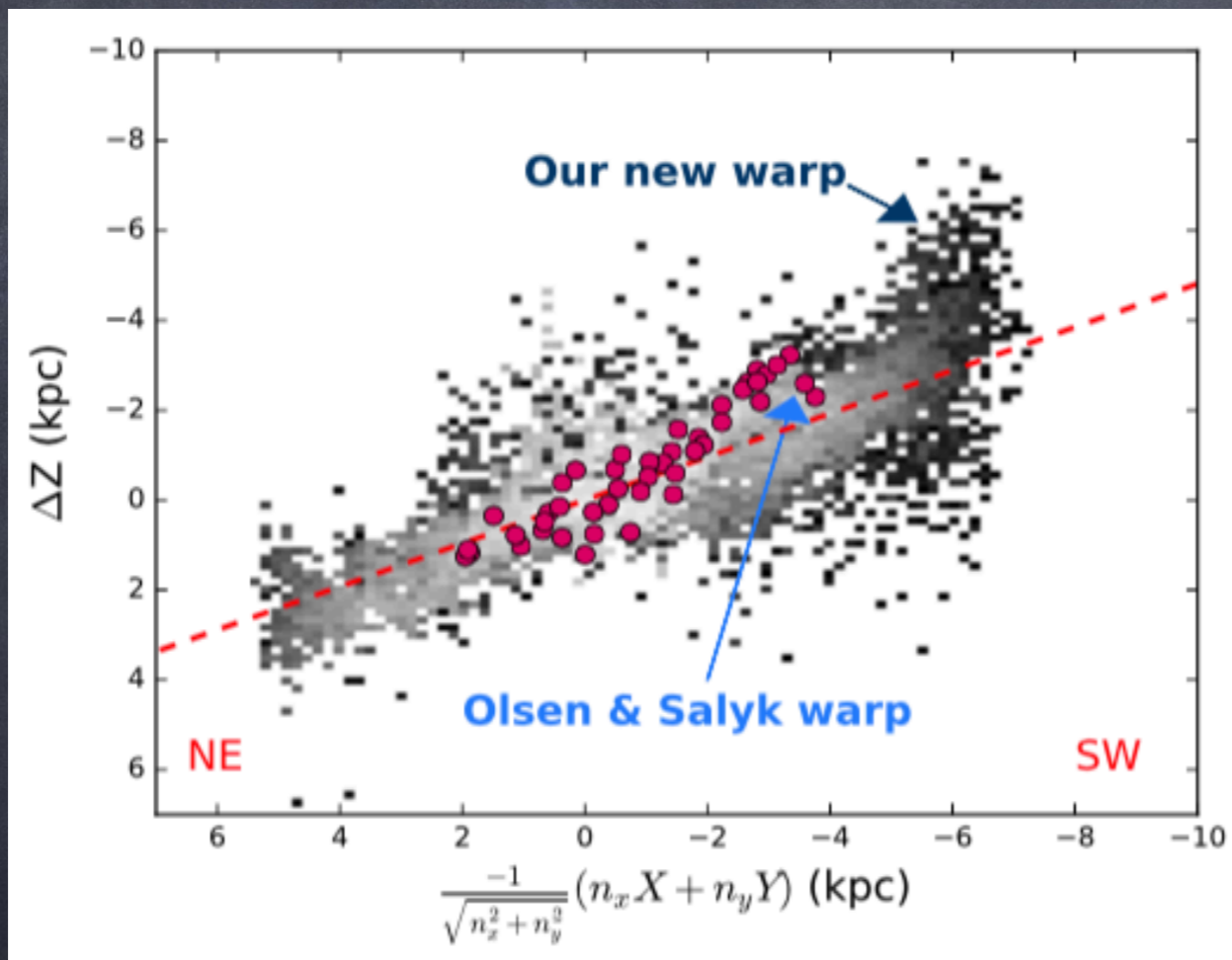


Choi et al. (2018a)

A New Warp and a Tilted Bar

Farther

Closer

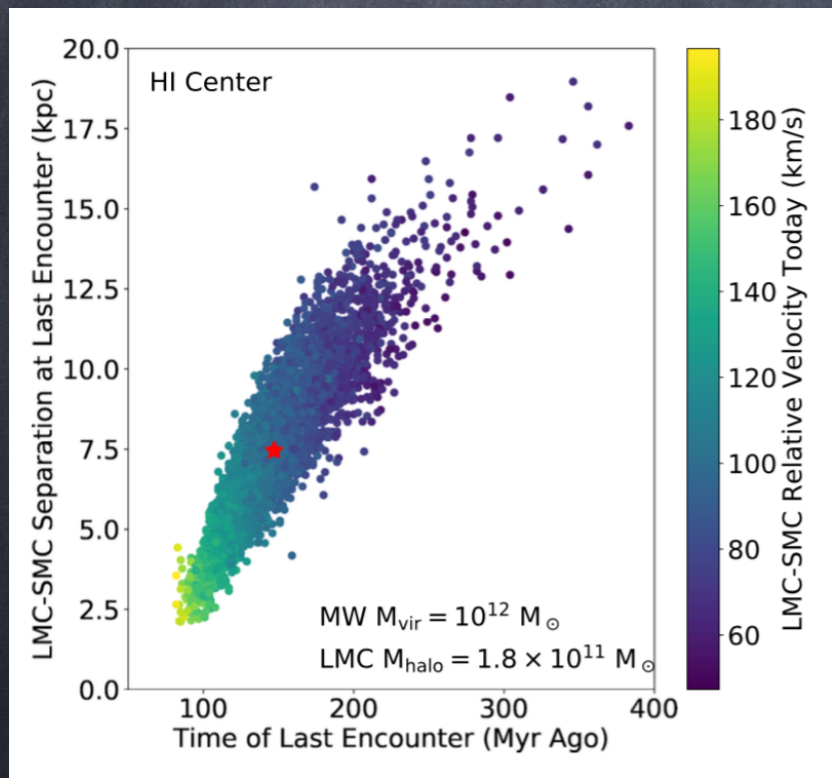


Choi et al. (2018a)

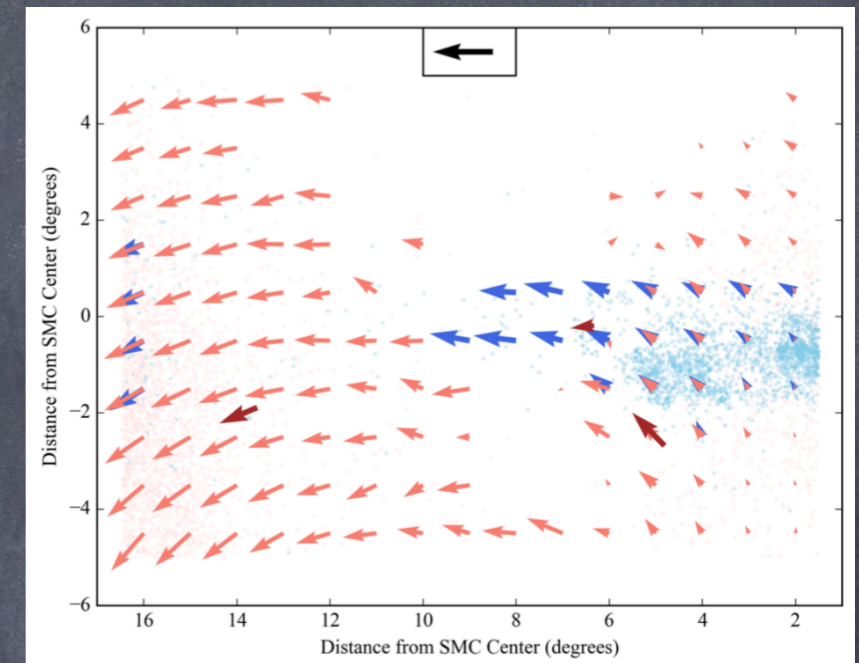
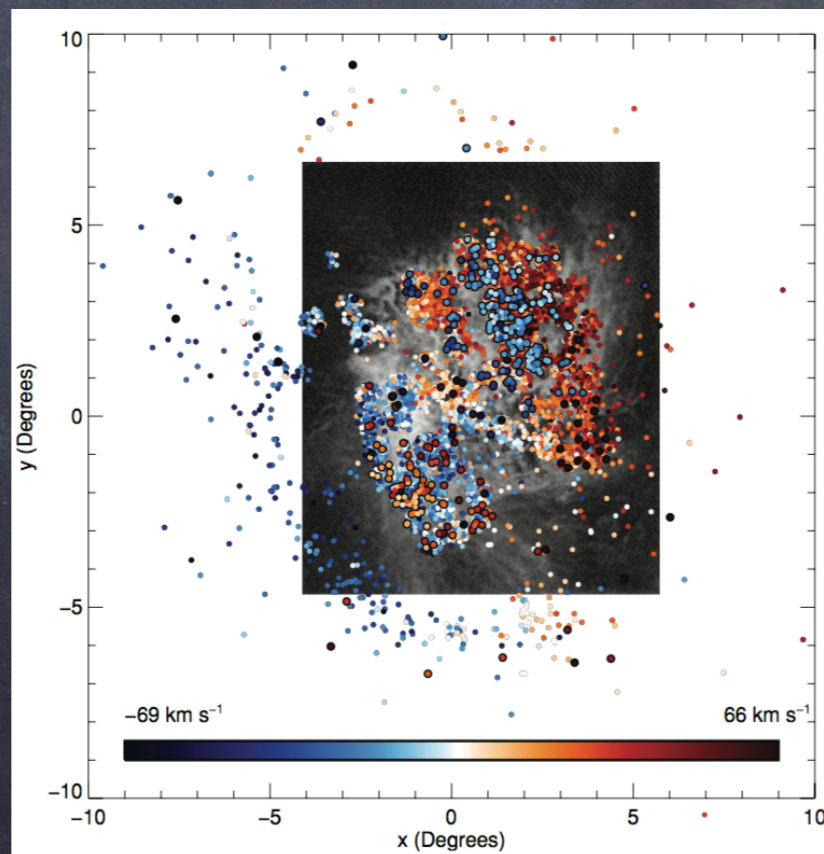
A simulation of the MCs with a recent direct collision predicts a similar warp in the LMC disk (Besla et al. 2012)

Evidence for a Recent Direct Collision between the MCs

- Impact parameter of ~ 7.5 kpc (Zivick et al. 2018)



- Stellar motion toward the SMC (Zivick et al. 2019)



- Accreted SMC stars in the LMC (Olsen et al. 2011)

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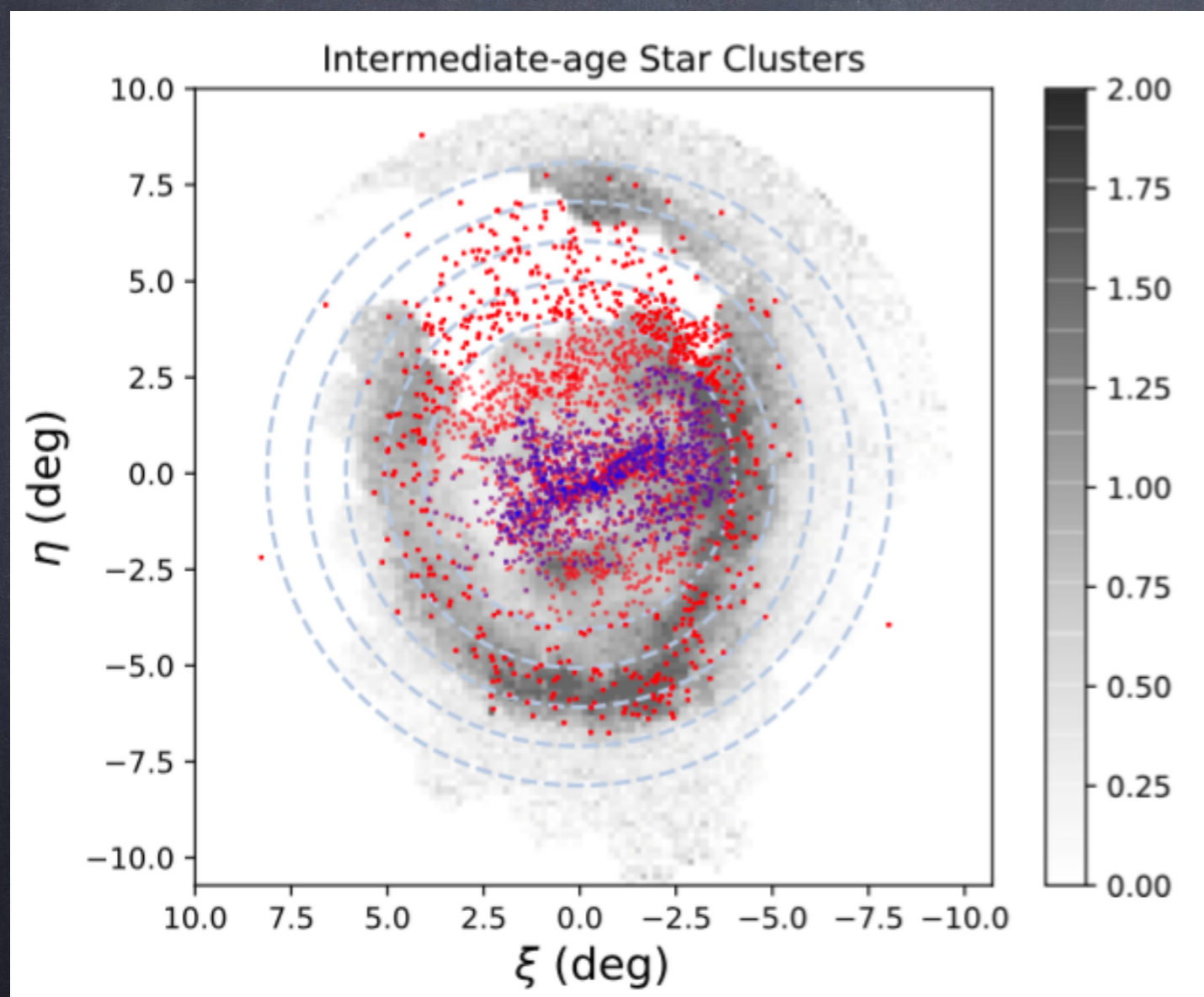
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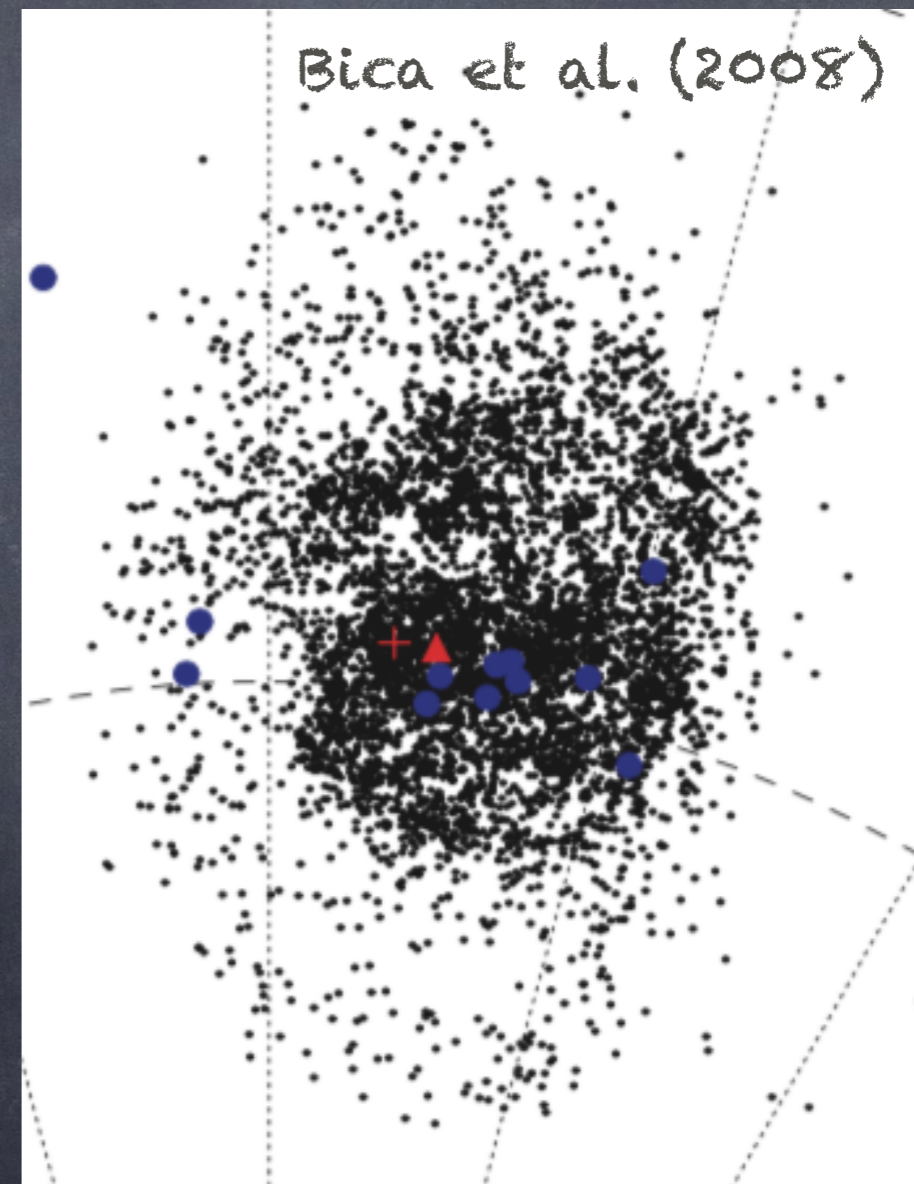
What's new in the LMC Main Disk?

A ring-like stellar overdensity at $\sim 6^\circ$

- Red: Bica clusters
- Blue: < 250 Myr (Nayak et al. 2016)

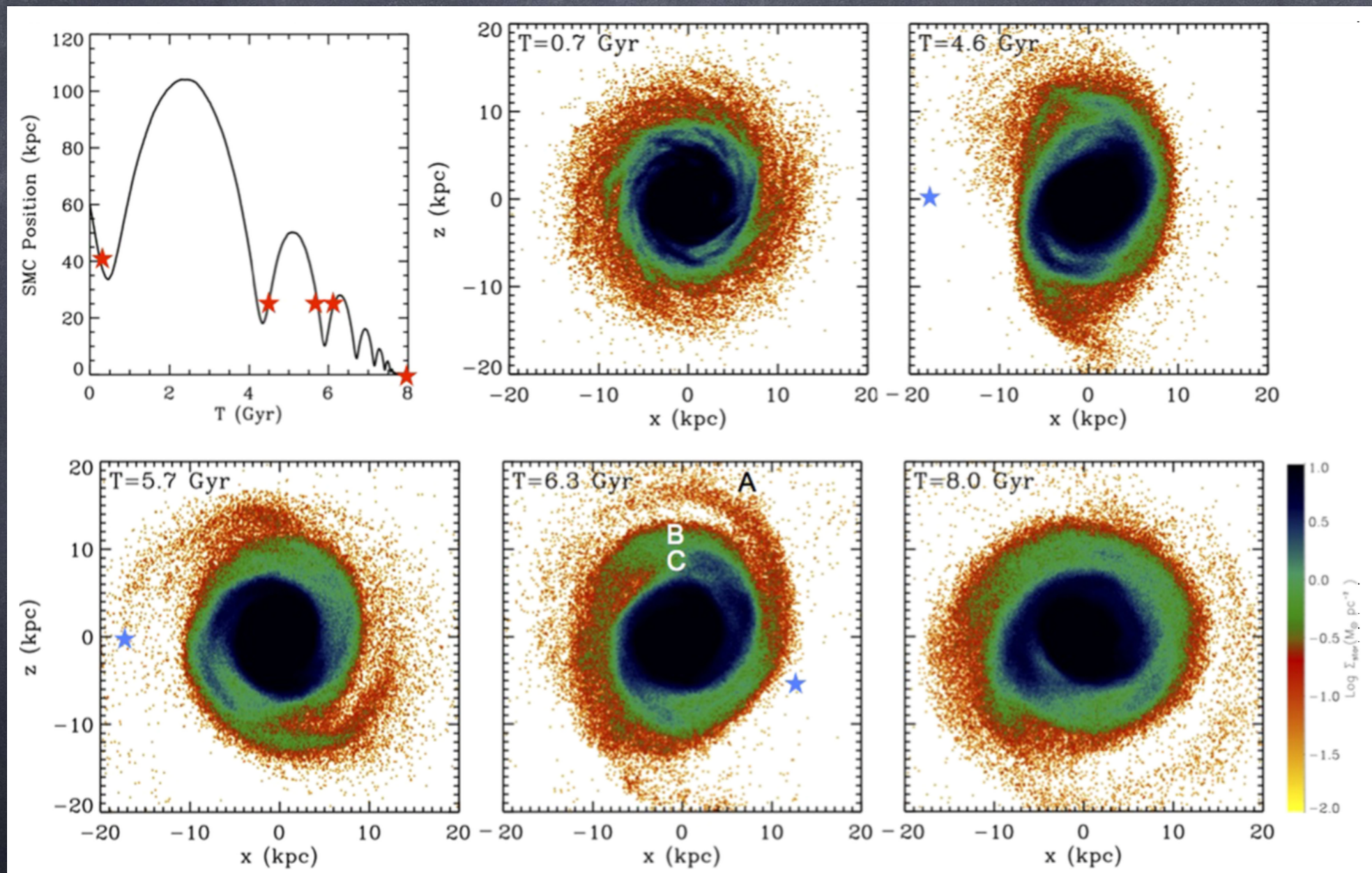


Choi et al. (2018b)



Completely Wrapped up Spiral Arm?

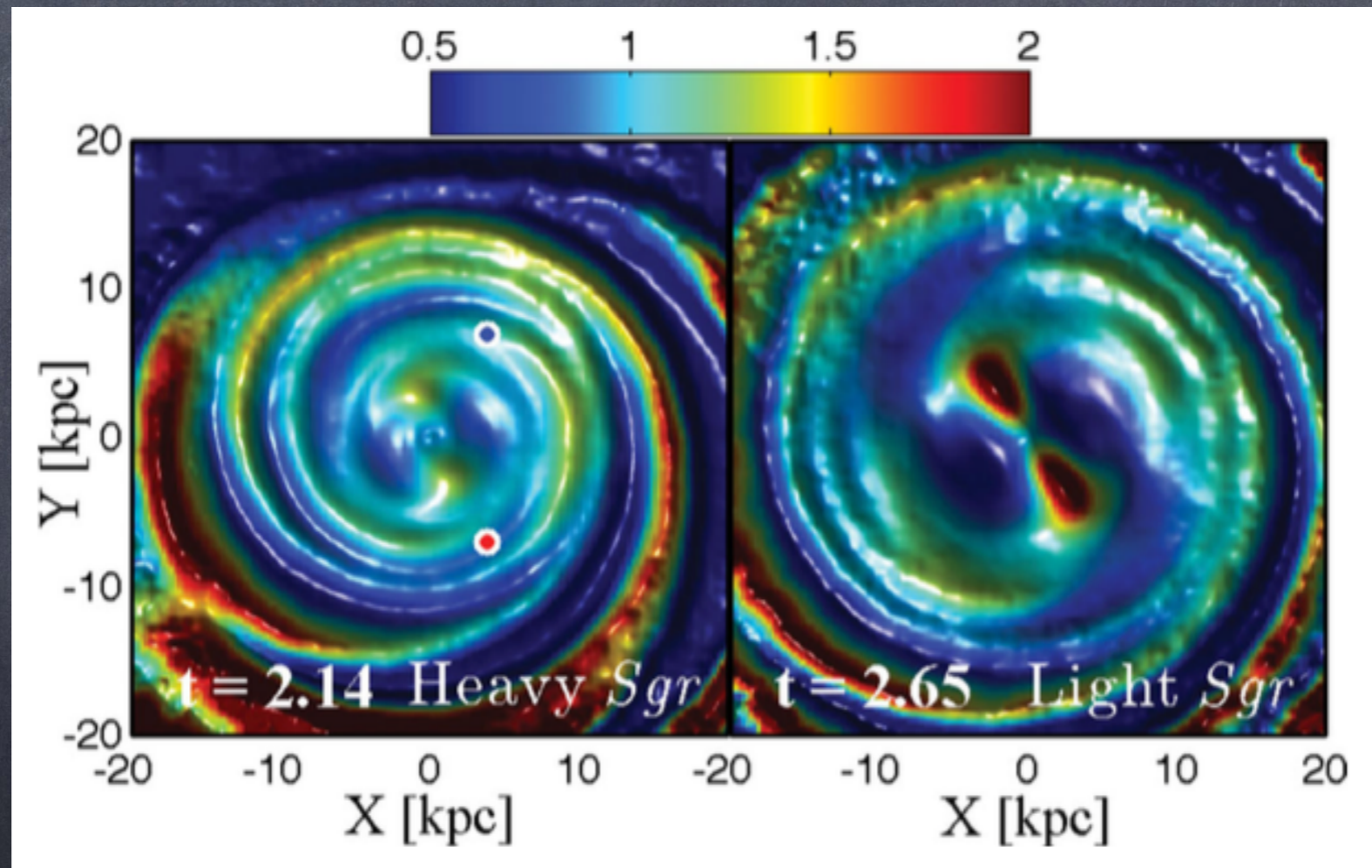
Repeated interactions with the SMC might do that!



Besla et al. (2016)

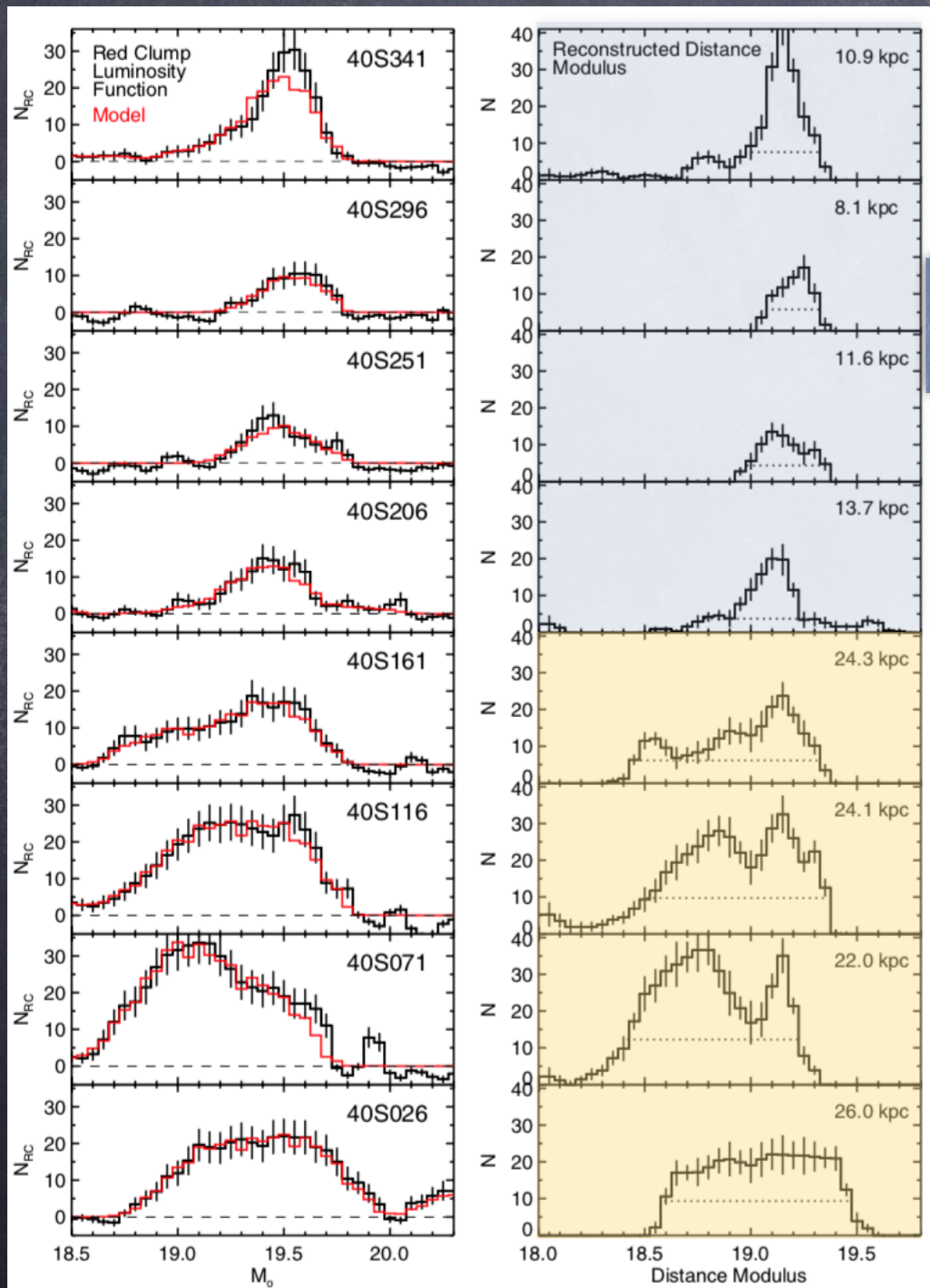
Response to the Recent Direct Collision with the SMC?

A ring-like stellar overdensity seen in MW-Sgr direct collision simulations

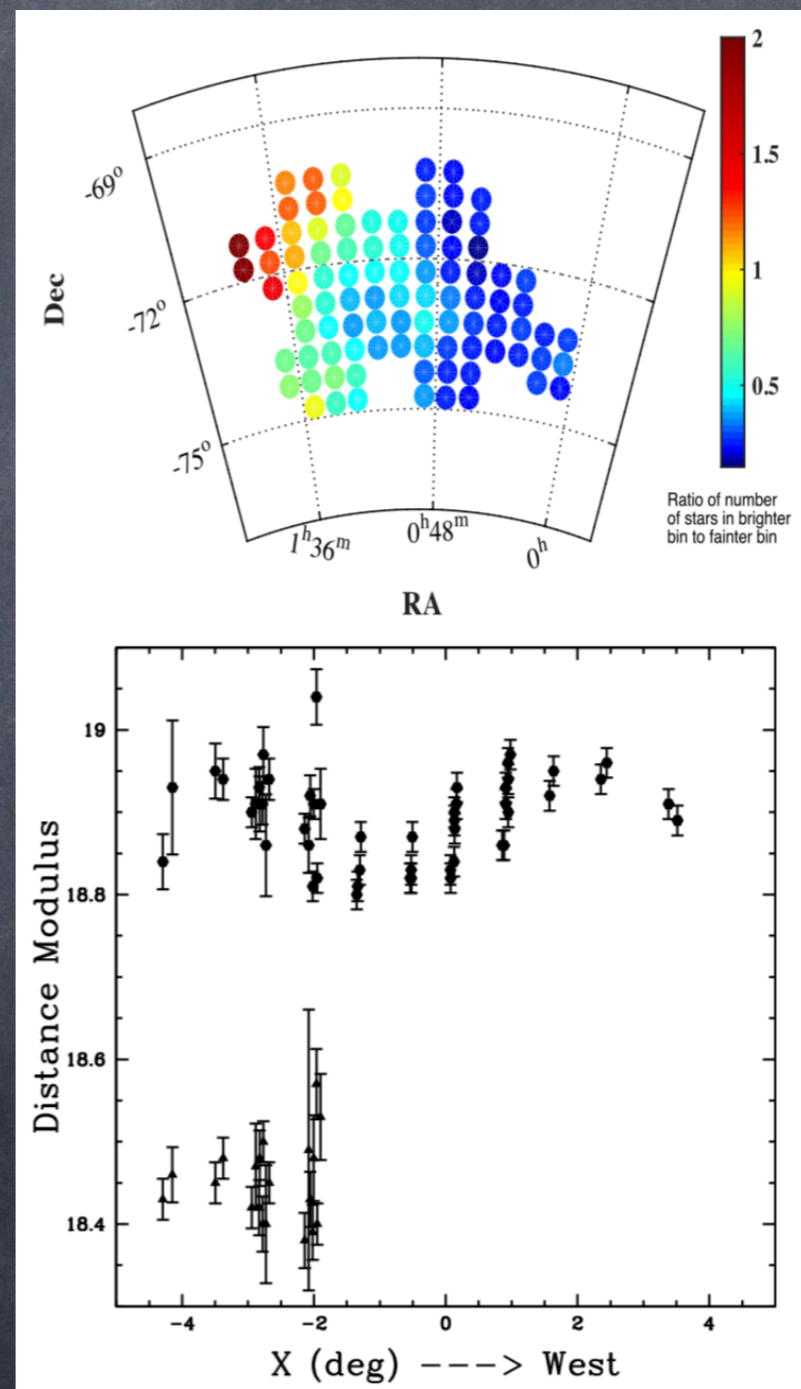


Gomez et al. (2013)

Ongoing Work on the SMC: Tidally Stripped Stars

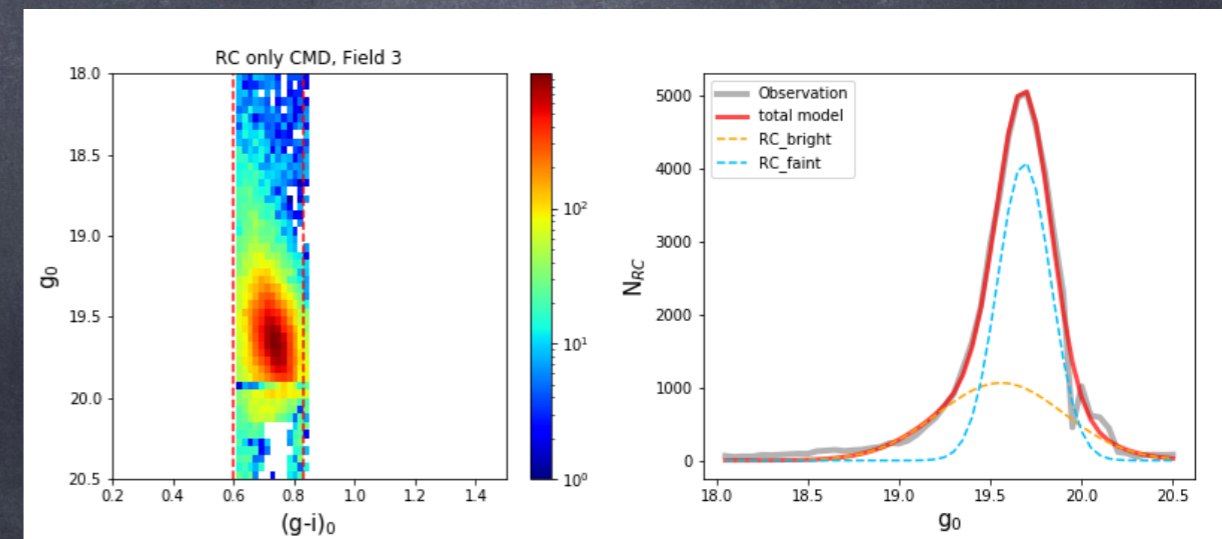
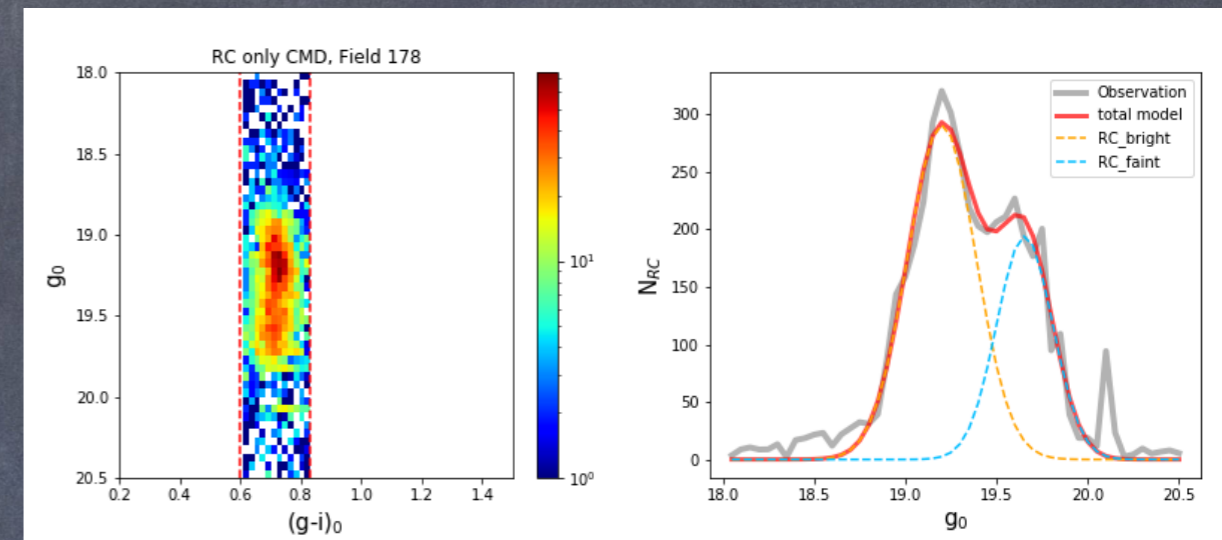
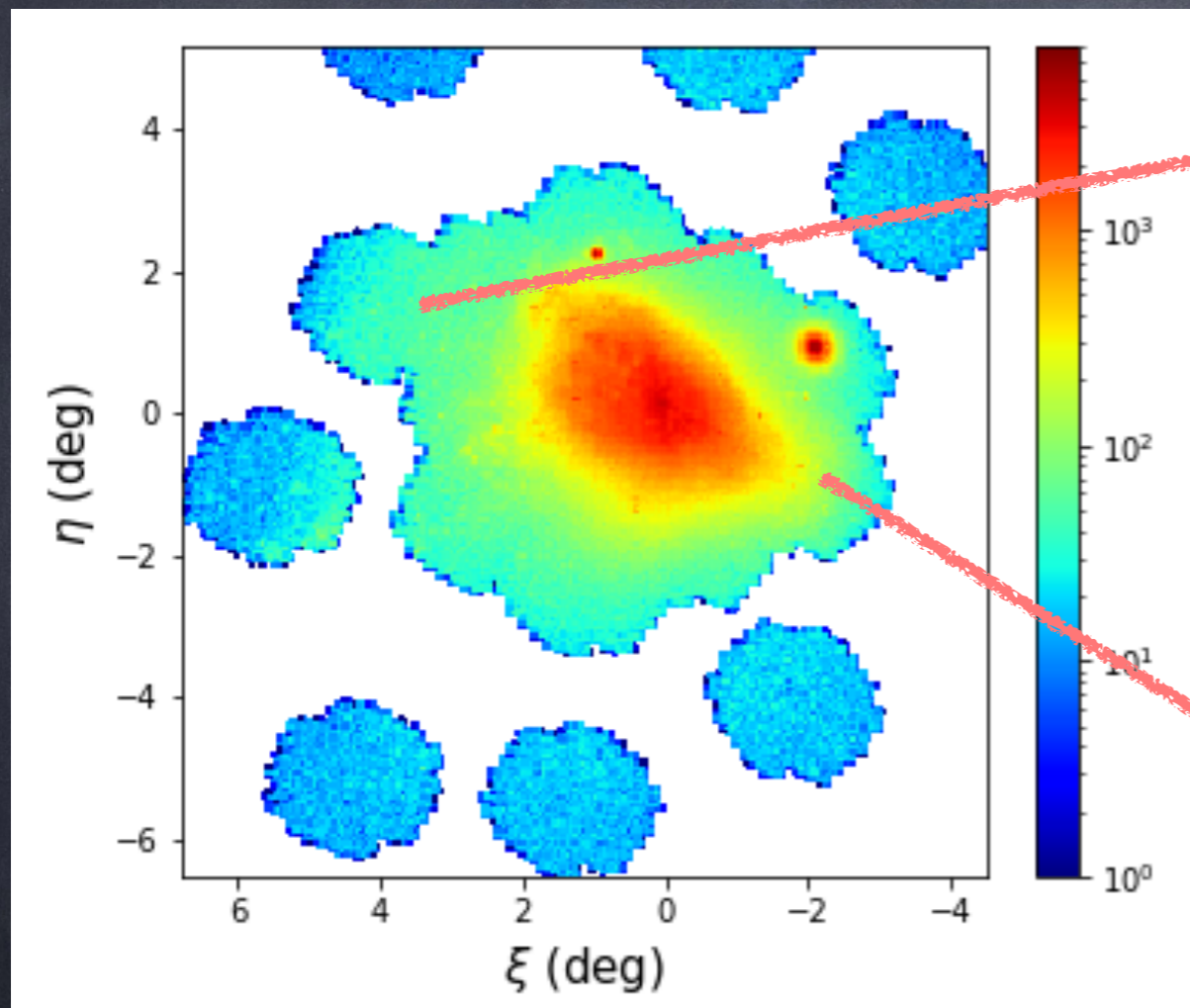


Nidever et al. (2013)



Subramanian et al. (2017)

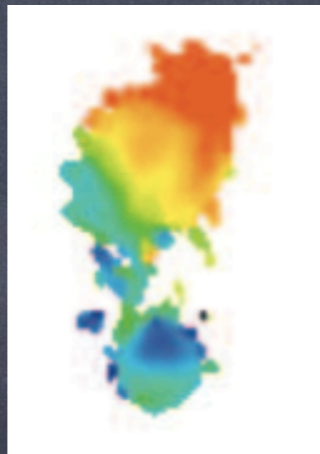
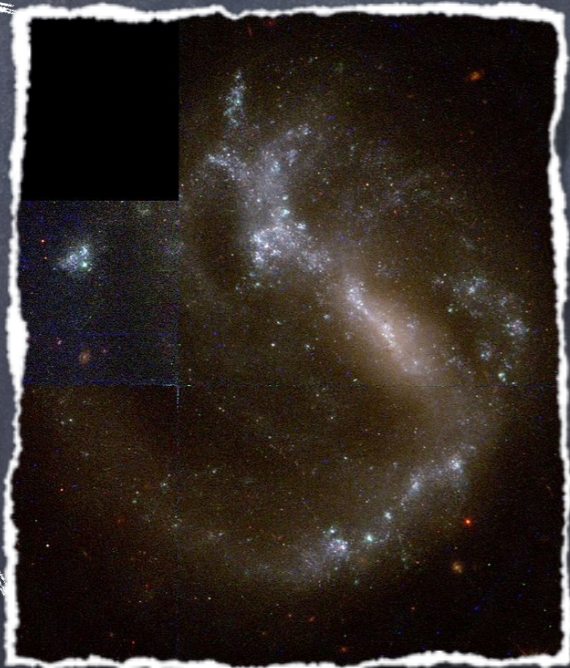
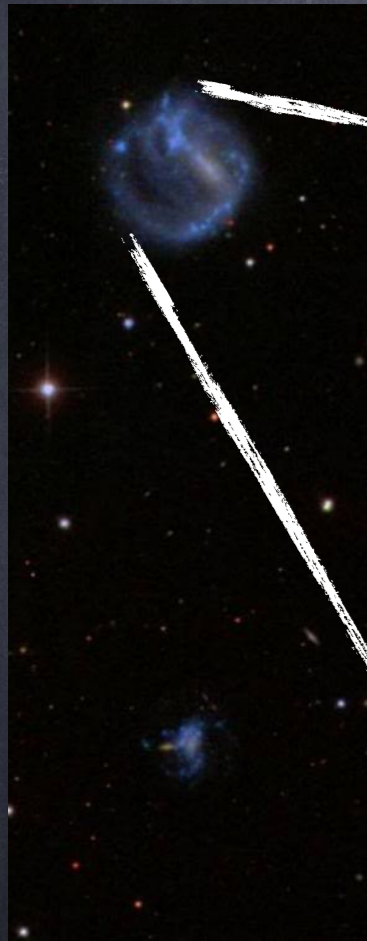
Bimodality in the RC Luminosity Function



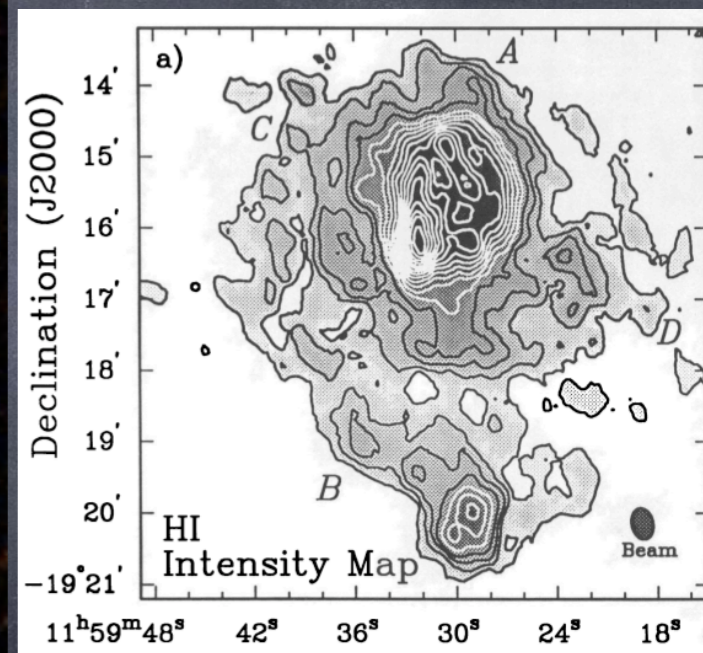
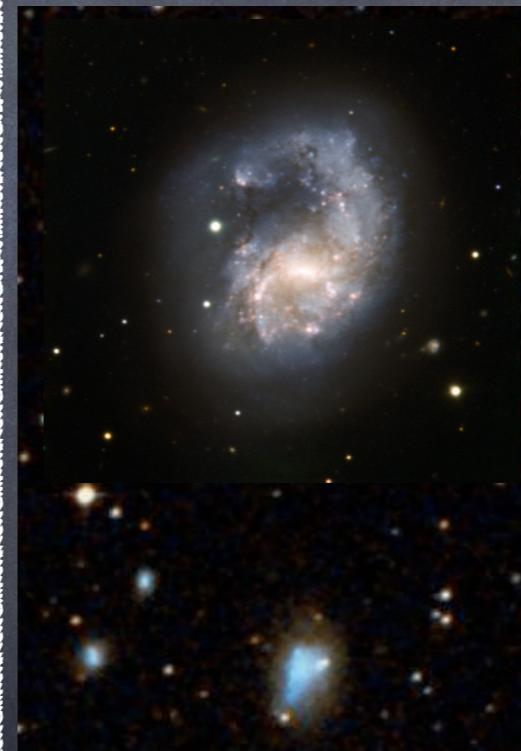
Choi et al. (in prep.)

Magellanic Irregulars with WFIRST

NGC 3664/3664A



NGC 4027/4027A



Thanks!