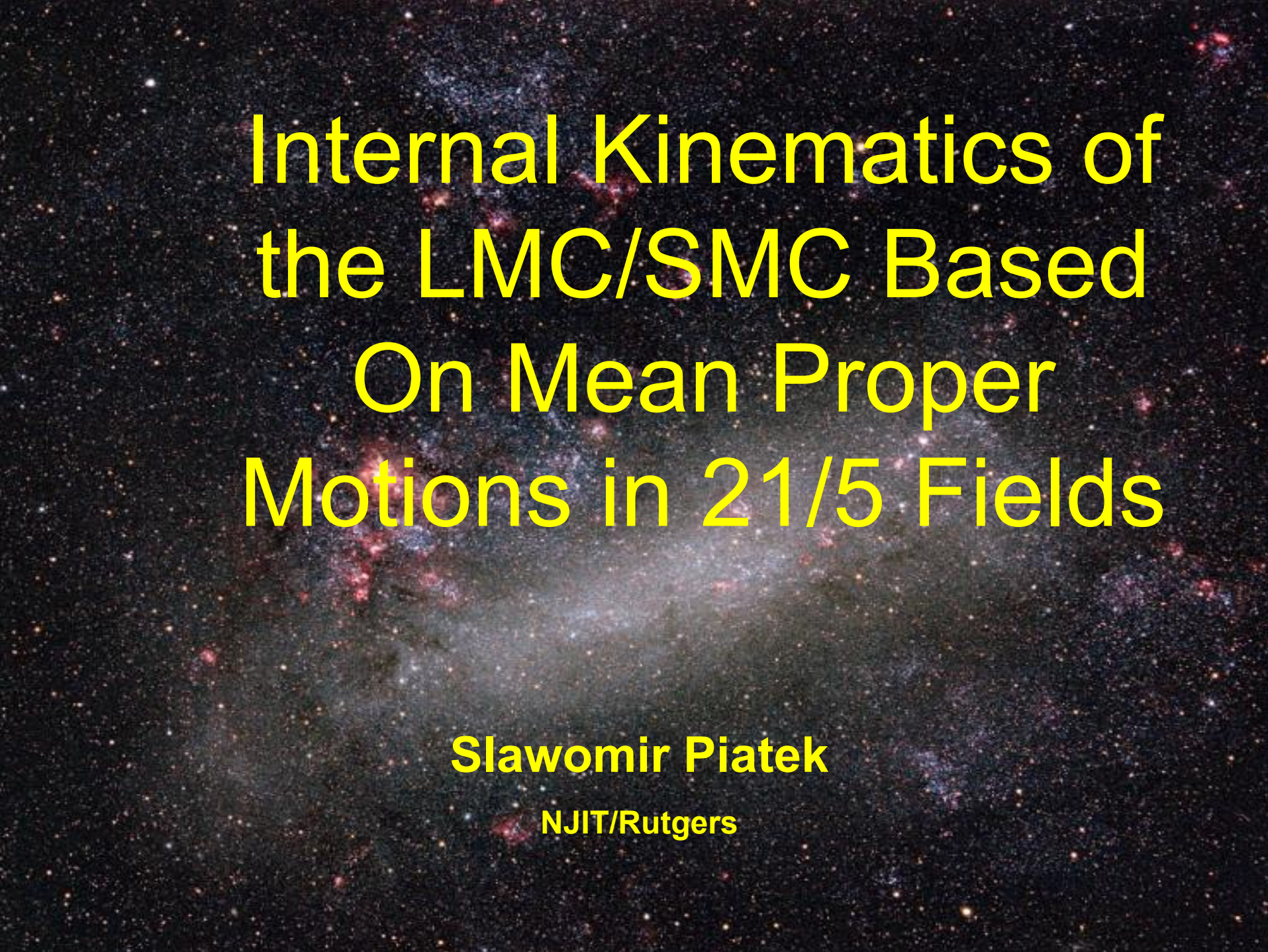


Internal Kinematics of the LMC/SMC Based On Mean Proper Motions in 21/5 Fields

Slawomir Piatek

NJIT/Rutgers

Data

LMC & SMC

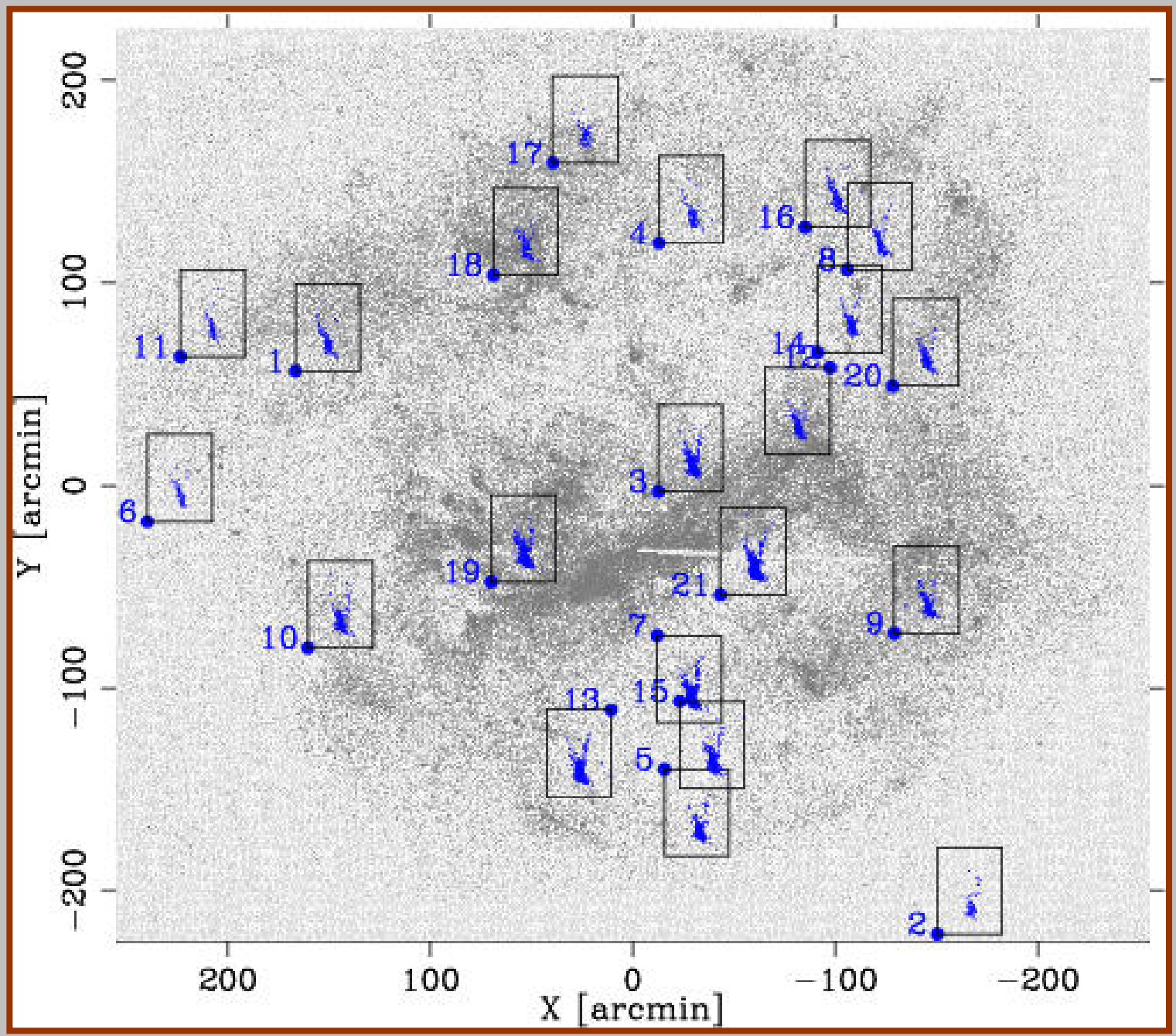
No. of epochs: 2 (1.1 – 2.8 years apart)

Camera: ACS/HRC

Filters: F606W (2 epochs), F814W (1st epoch)

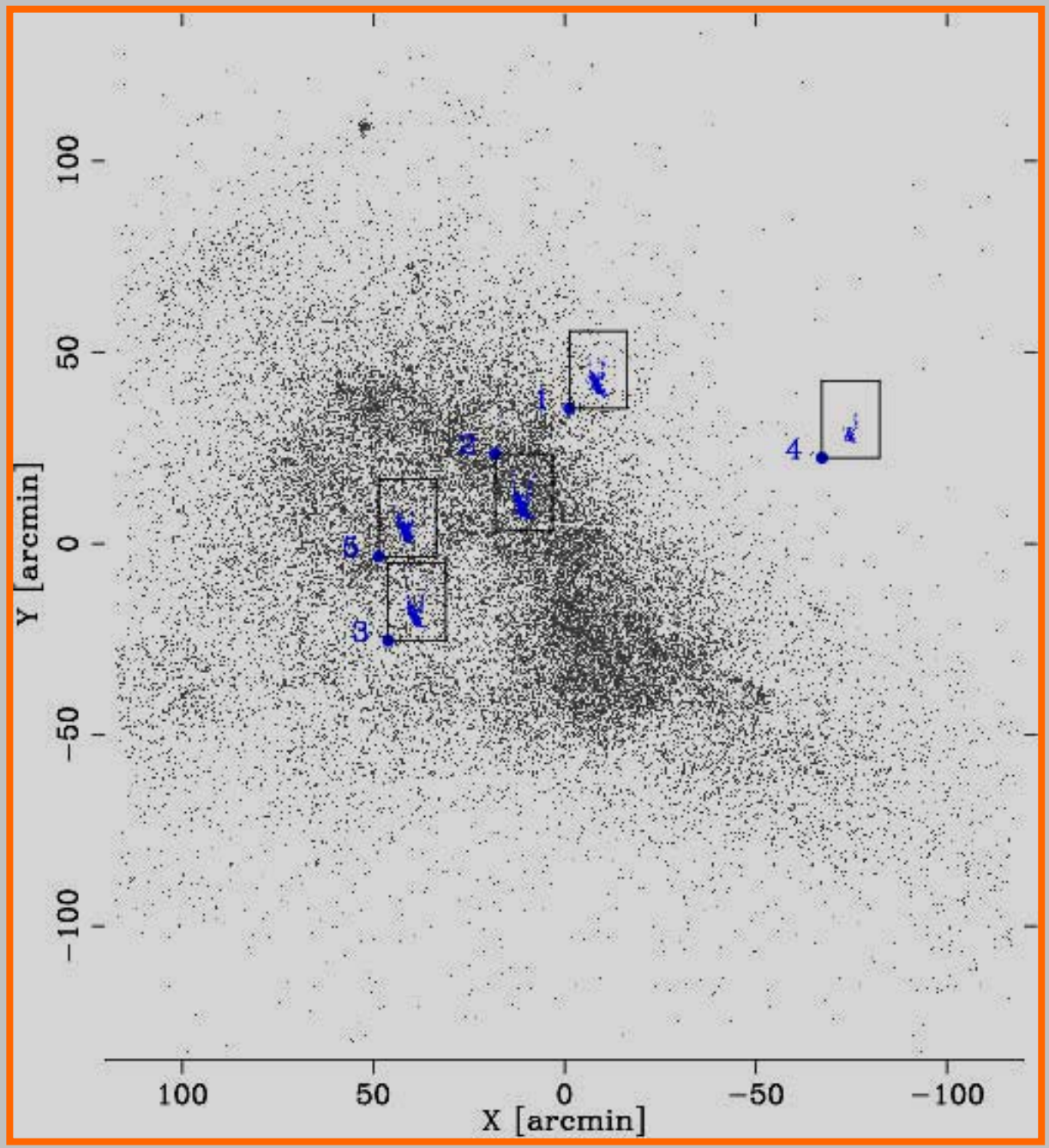
No. of fields: 21 & 5

LMC



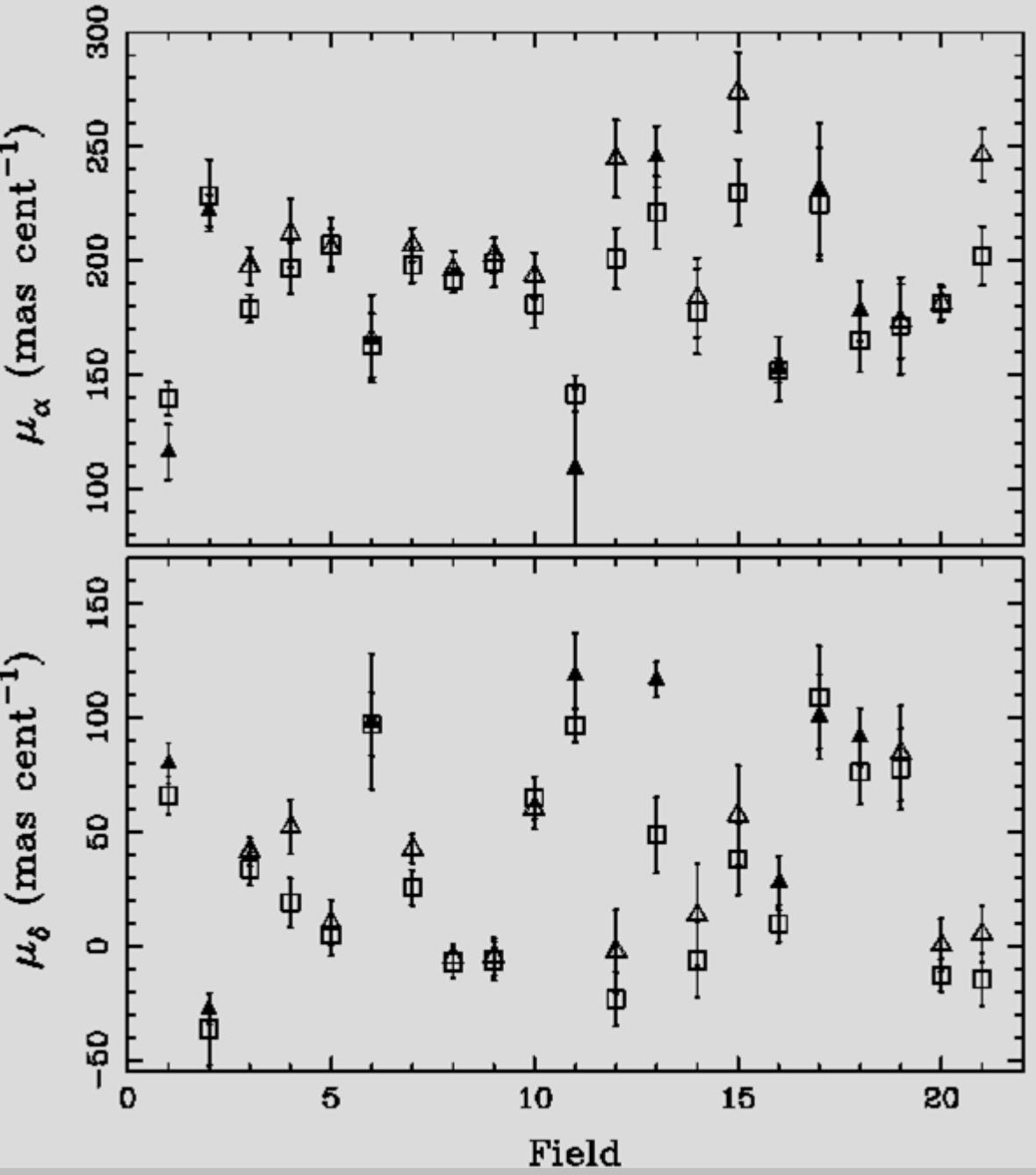
Field Locations Imaged with HST

SMC



Field Locations Imaged with HST

LMC

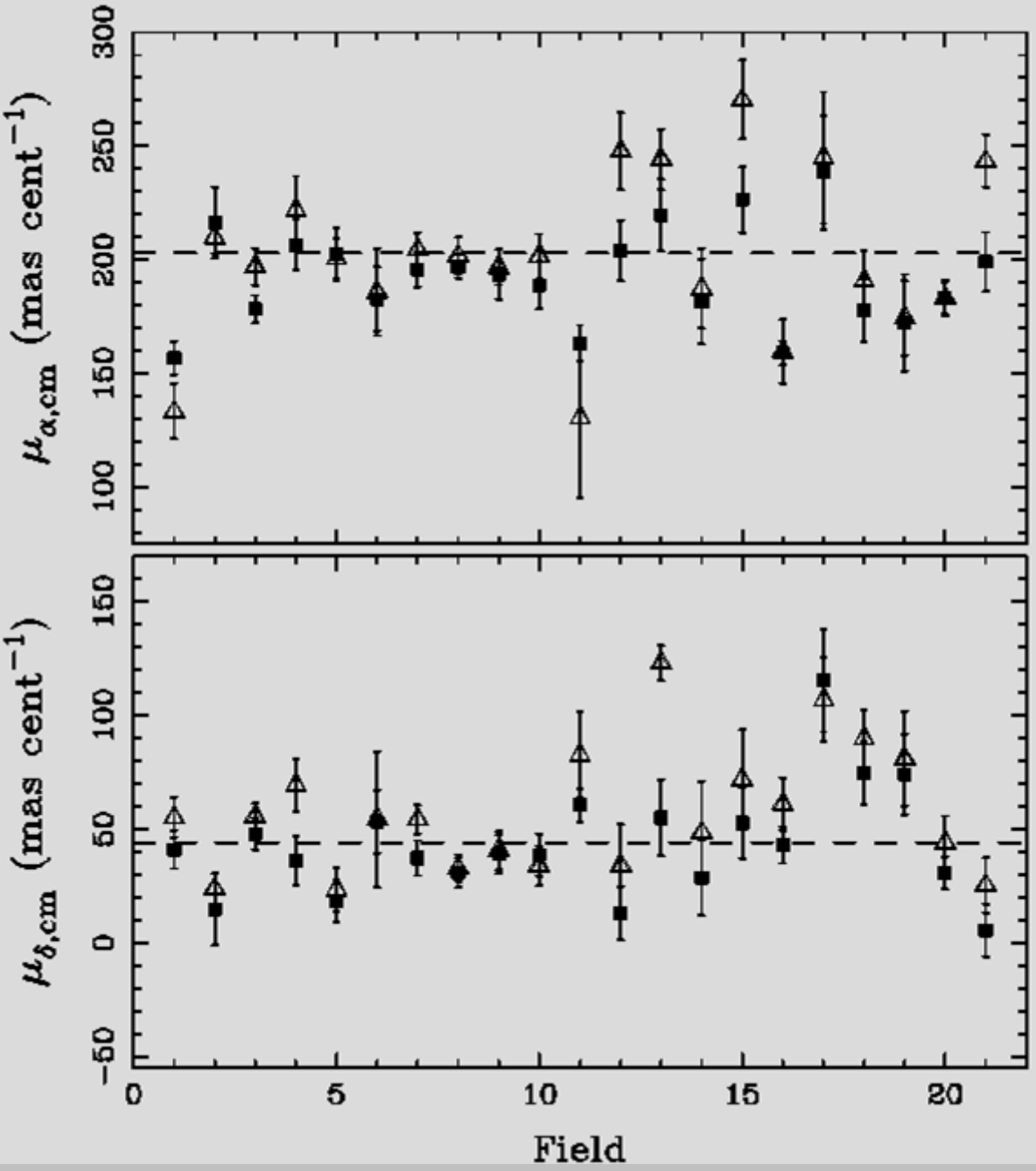


Measured Proper Motions

Δ = K06a

□ = Our work

LMC

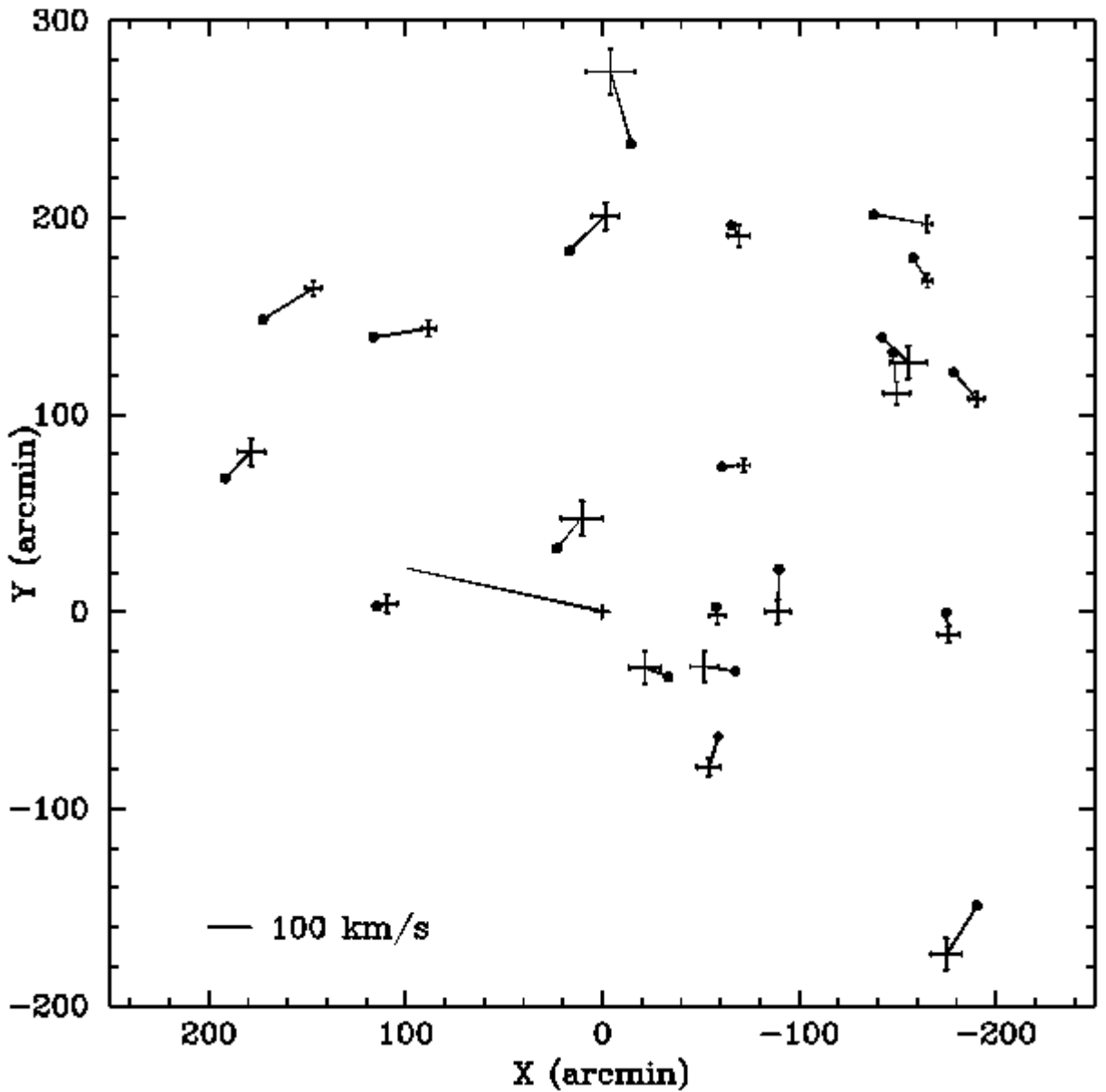


Proper Motions Corrected For Perspective and Rotation Using K06a Values

Δ = K06a

▪ = Our work

Proper Motions Corrected For Perspective vs. Location



Note a clockwise rotation.

μ_α=197.0±3.7 mas/cent

μ_δ=44.0±3.7 mas/cent

i = 34.7°

Θ = 129.9°

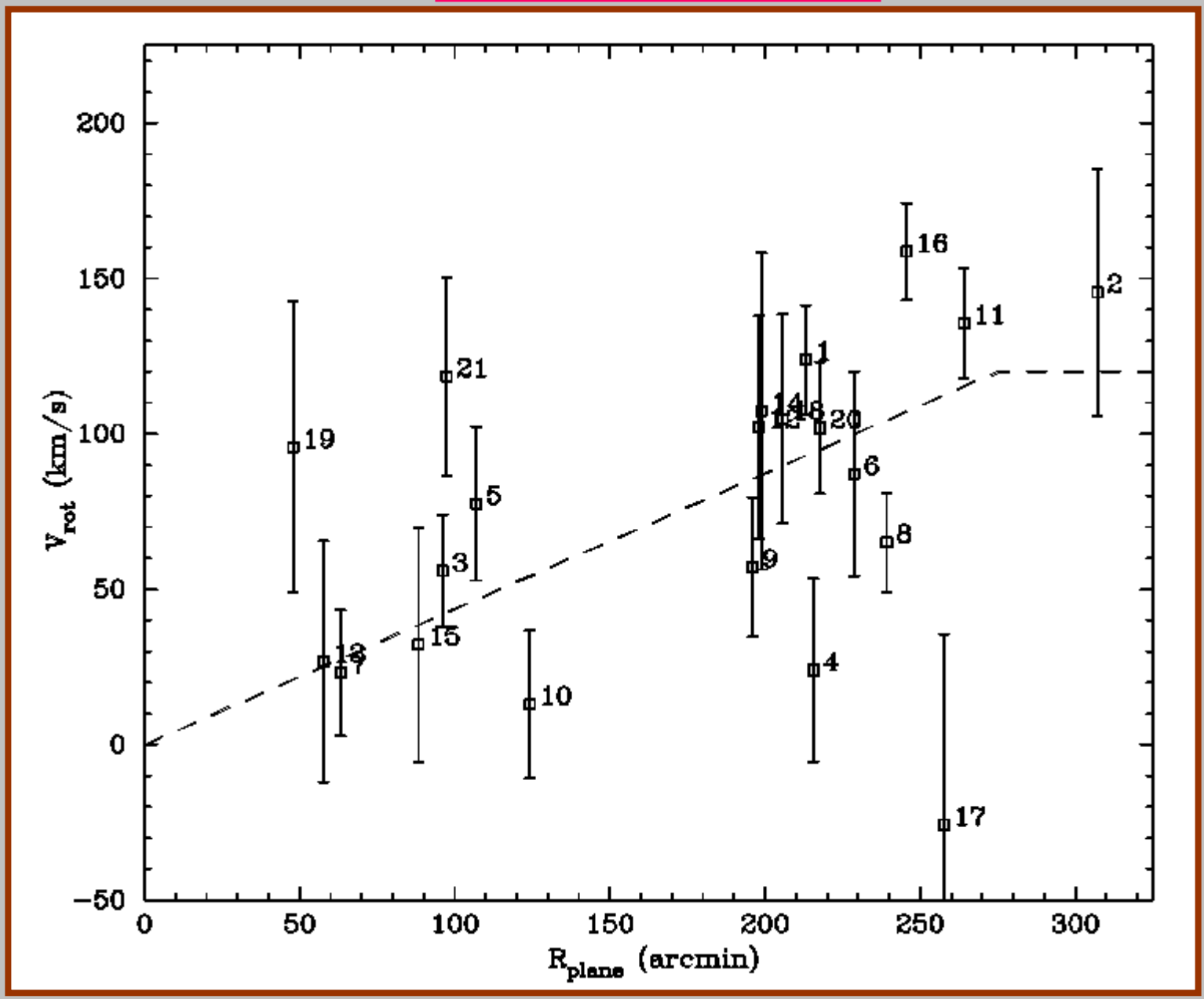
α = $5^h27.6^m$

δ = -69°52.2‘

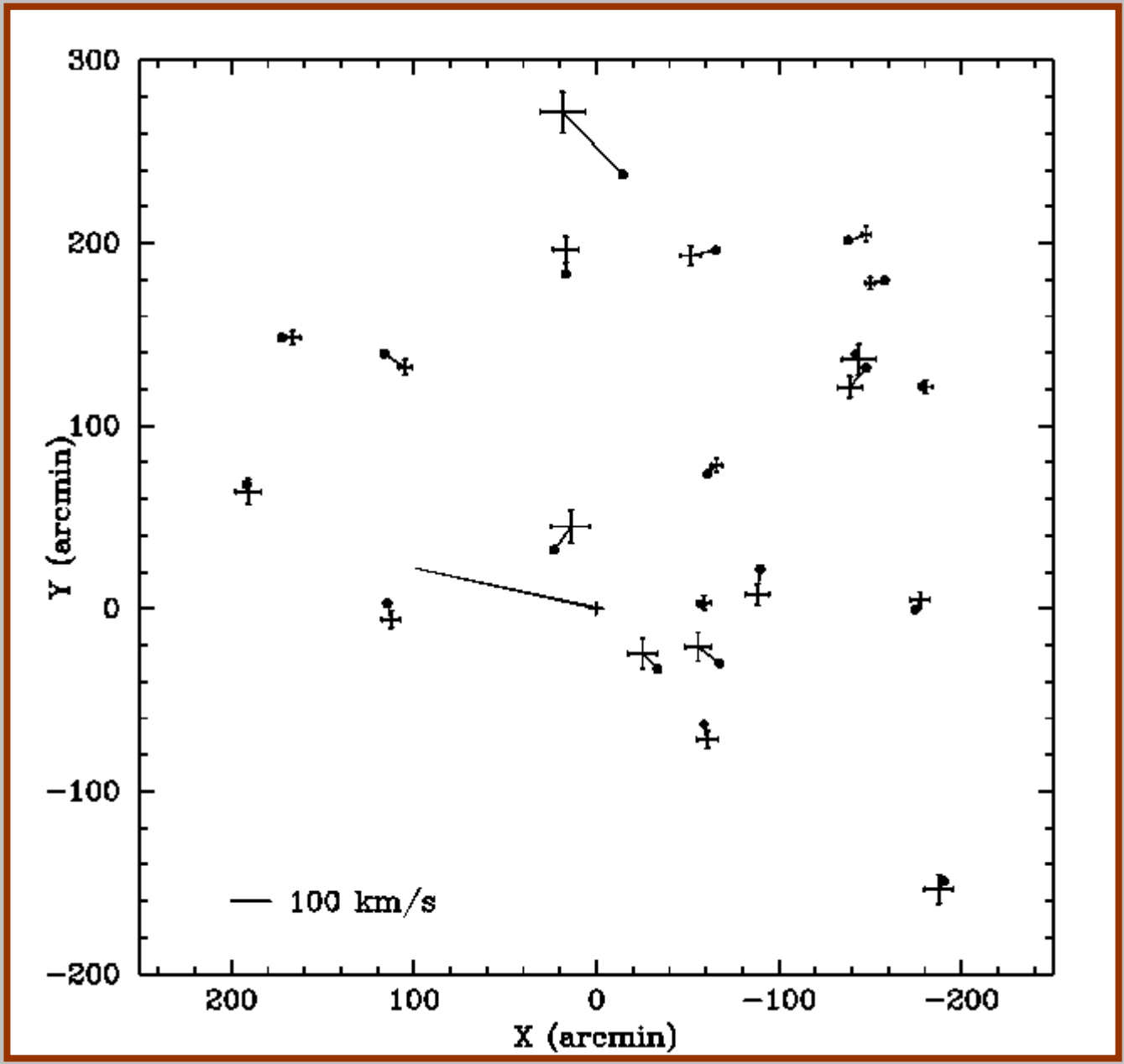
van der Marel et al. 2002

LMC

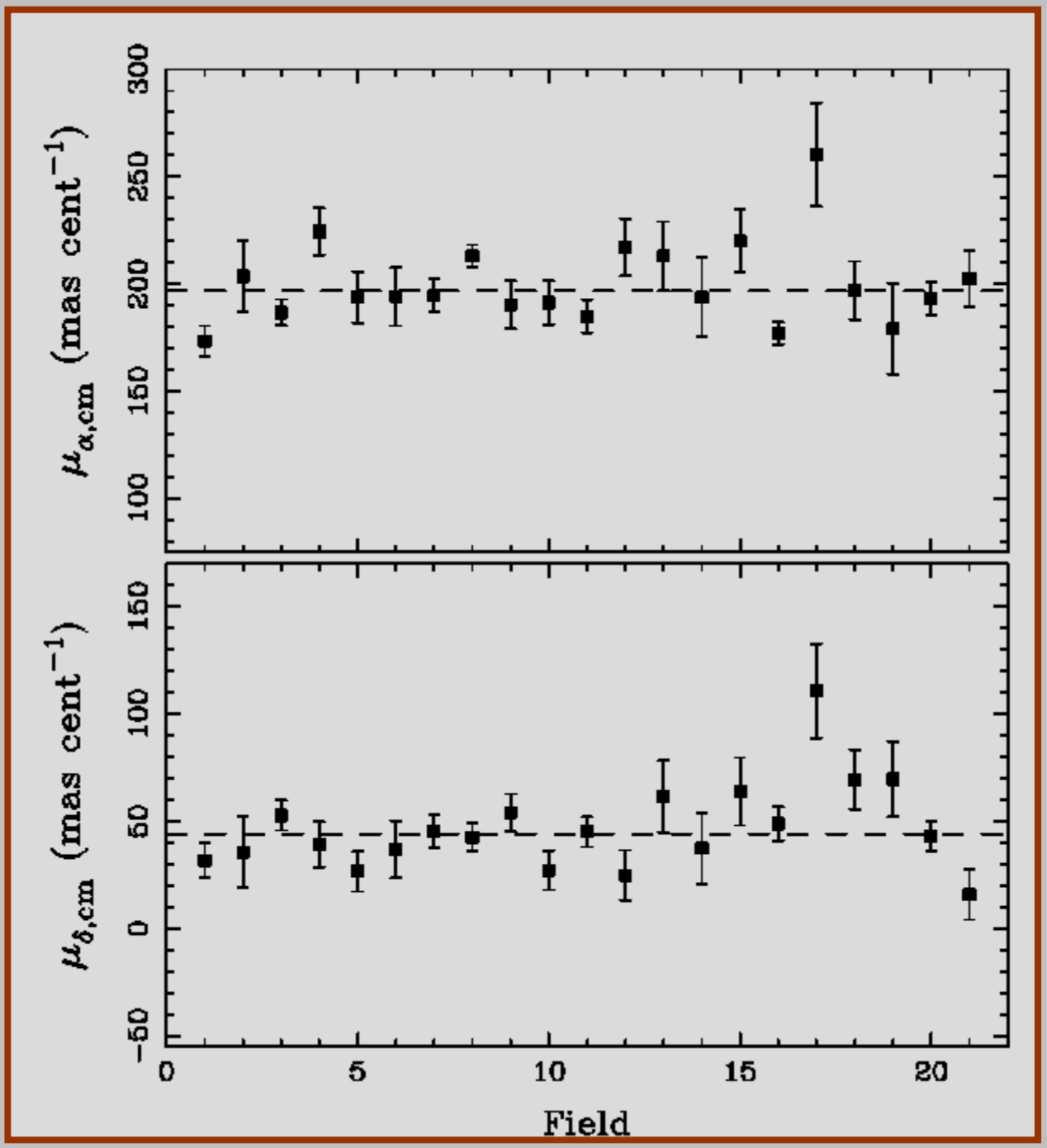
V_{flat}=12 km/s



Residual Proper Motions



LMC



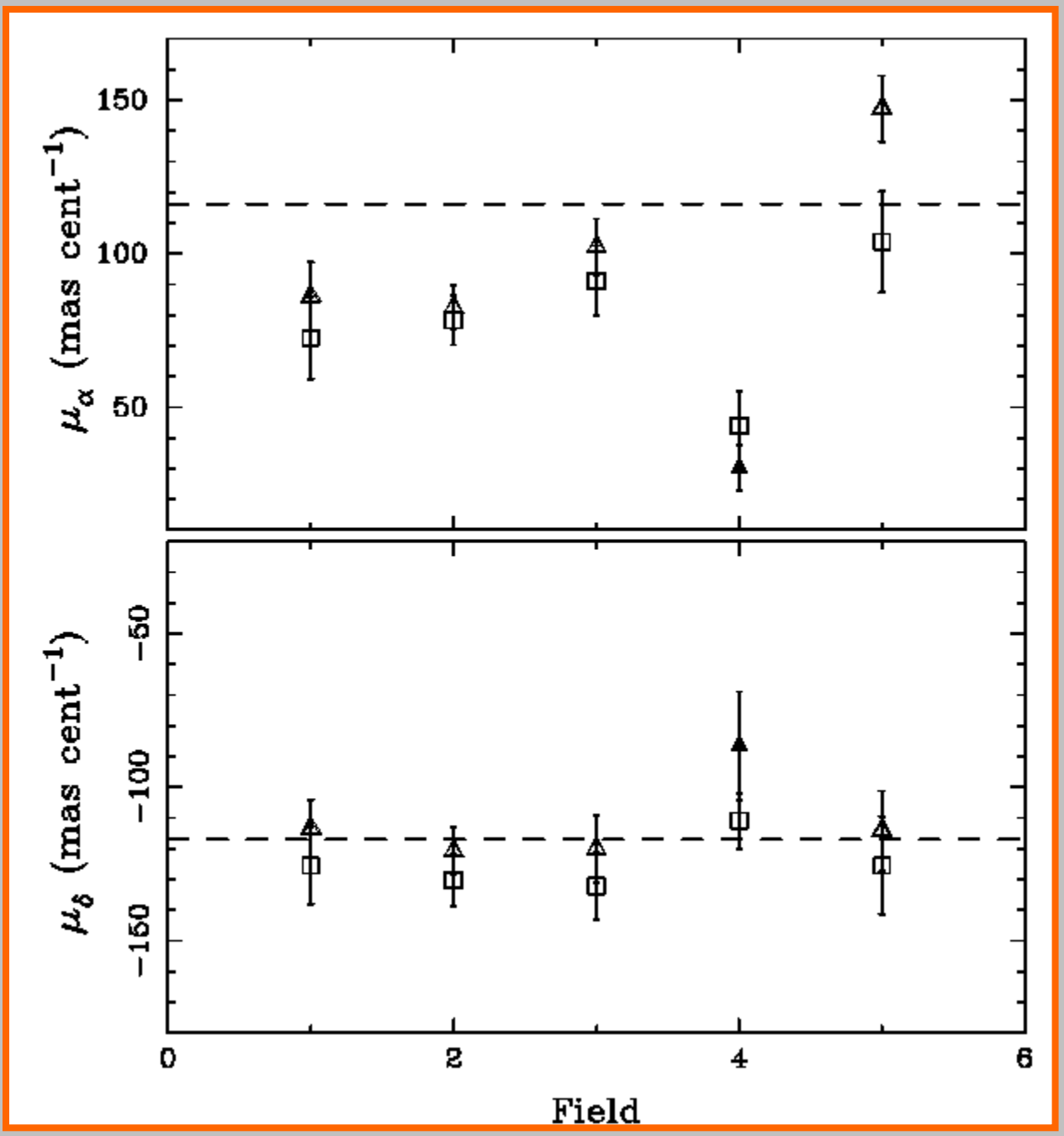
Proper Motions Corrected For Perspective and Rotation Using Our Values

- = Our work

μ_α=197.0±3.7 mas/cent

μ_δ=44.0±3.7 mas/cent

SMC

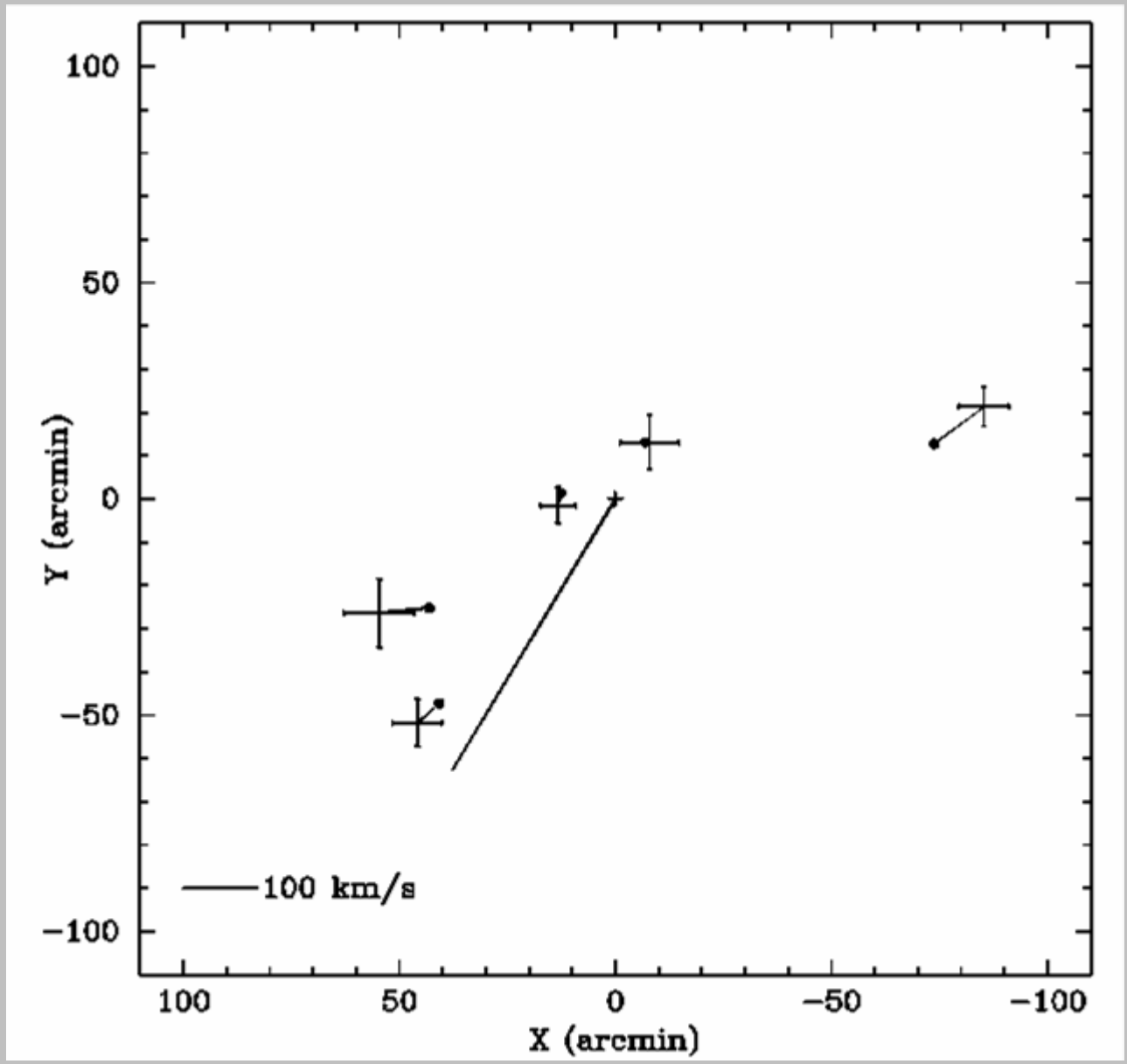


Measured Proper Motions

Δ = K06b

□ = Our work

Proper Motions Corrected For Perspective vs. Location



Streaming?

μ_α=75.5±6.1 mas/cent

μ_δ=-125.2±5.8 mas/cent

i = 40°

Θ = 220°

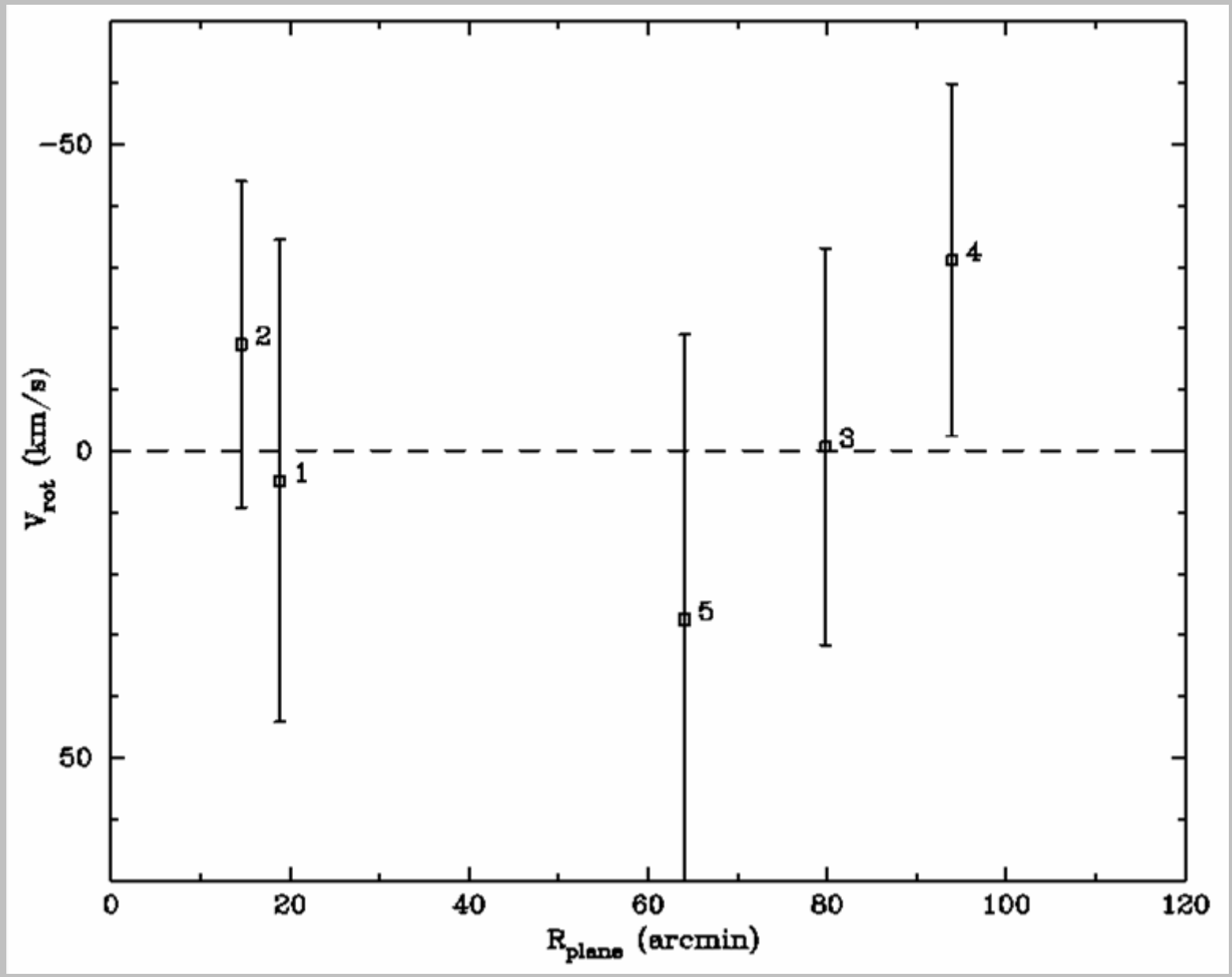
α = $0^h62.8^m$

δ = -72°30‘

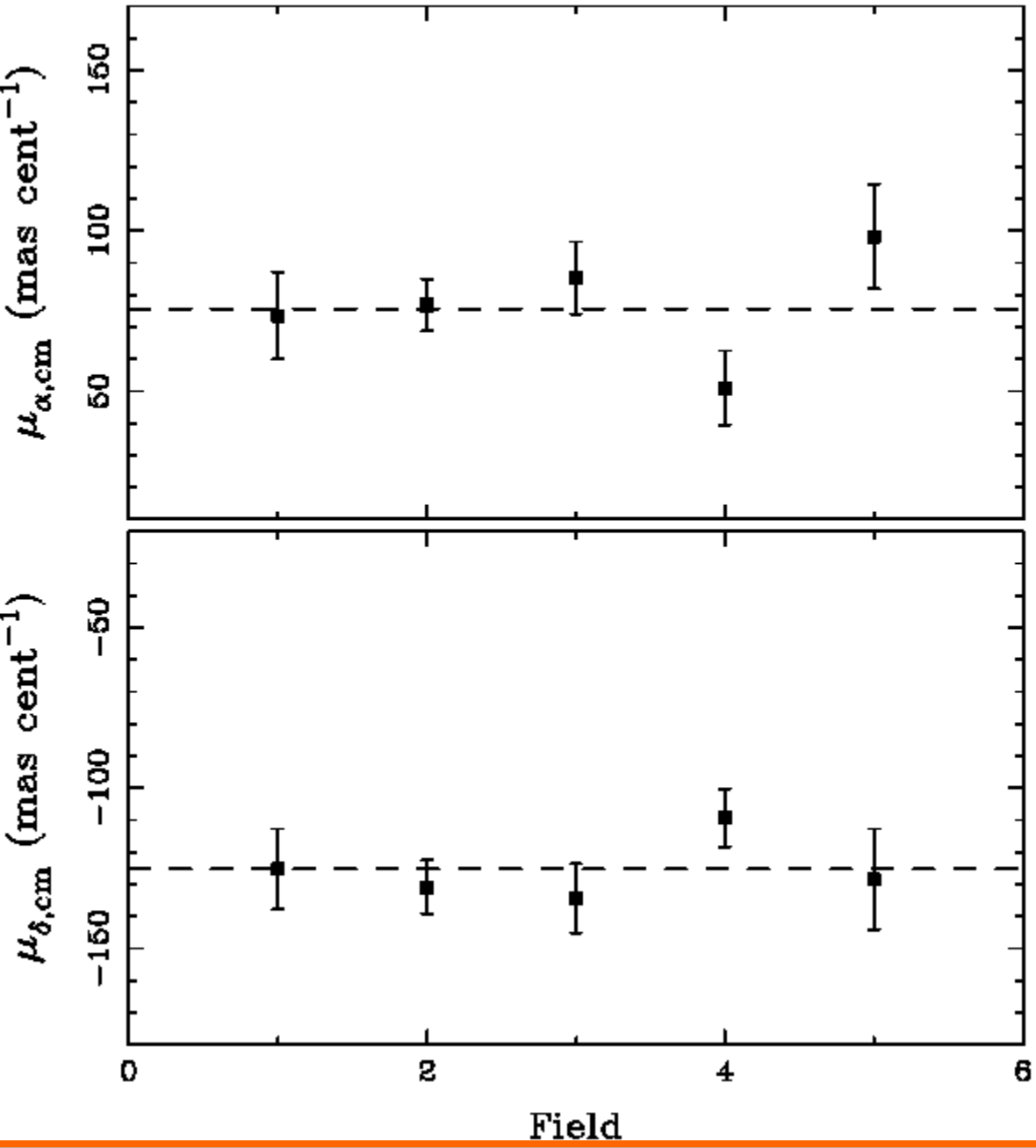
Stanimirović et al. 2004

SMC

No indication of rotation



SMC



Proper Motions Corrected For Perspective Using Our Values

▪ = Our work

μ_α=75.5±6.1 mas/cent

μ_δ=-125.2±5.8 mas/cent

Conclusion

We detect rotation in the LMC using proper motions. The flat portion of the rotation curve has a best-fit amplitude of 120±20 km/s

We do not detect rotation in the SMC. The proper motions suggest the presence of radial expansion.