



# 3D mapping of the Solar Neighbourhood with Gaia DR2

Eleonora Zari,  
H. Hashemi, A. Brown, T. de Zeeuw, K. Jardine

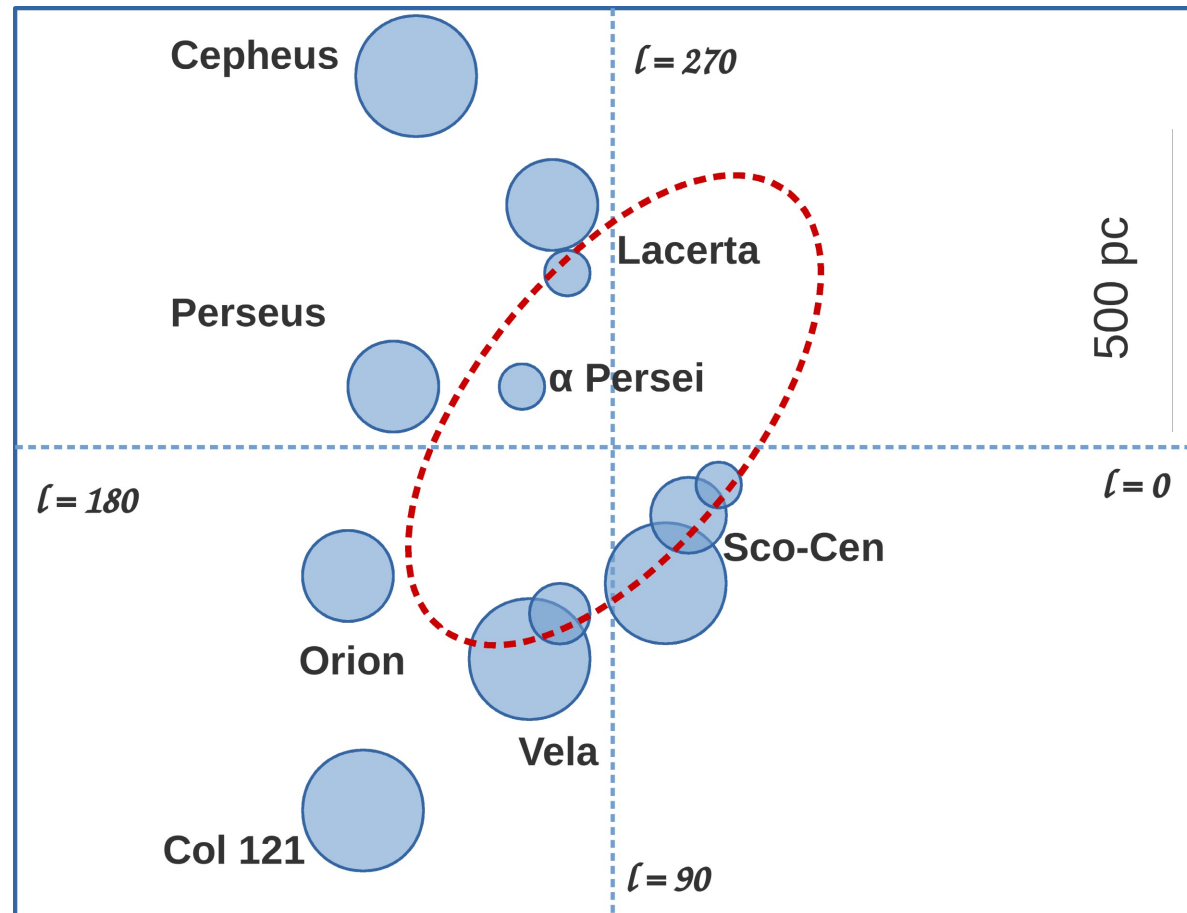
Leiden Observatory

# The Gould Belt

- OB type stars cluster in loose groups  
→ OB associations.
- They seem to form a belt.
- Giant molecular clouds are found to be related to the most prominent OB associations.

## Formation scenarios:

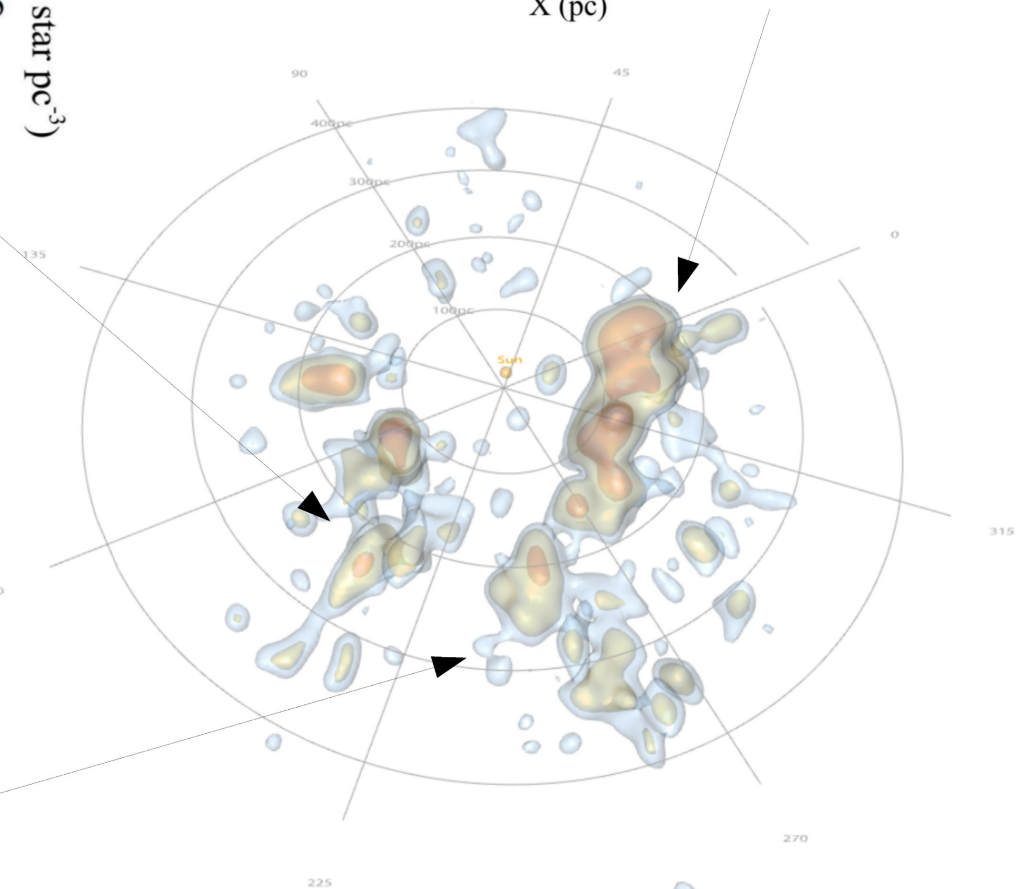
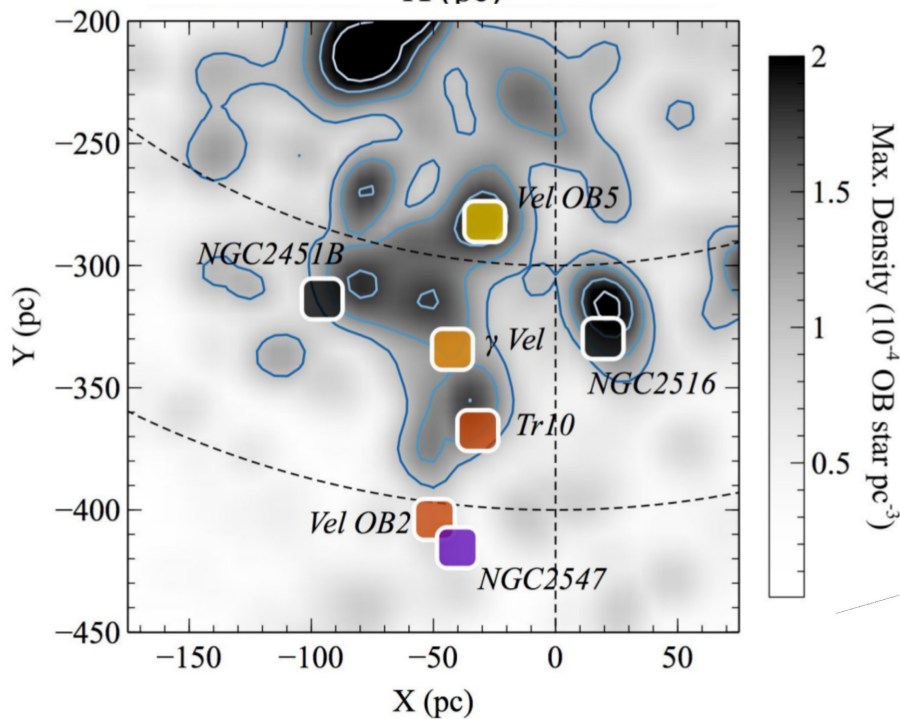
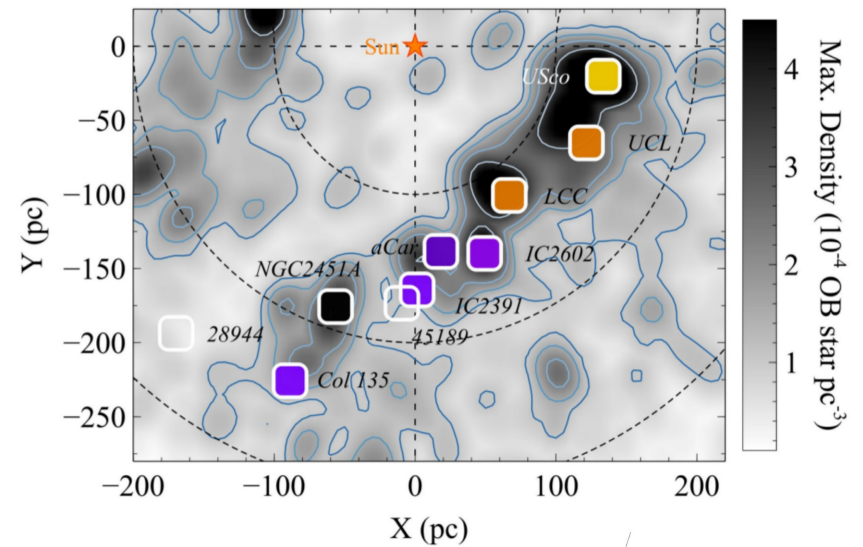
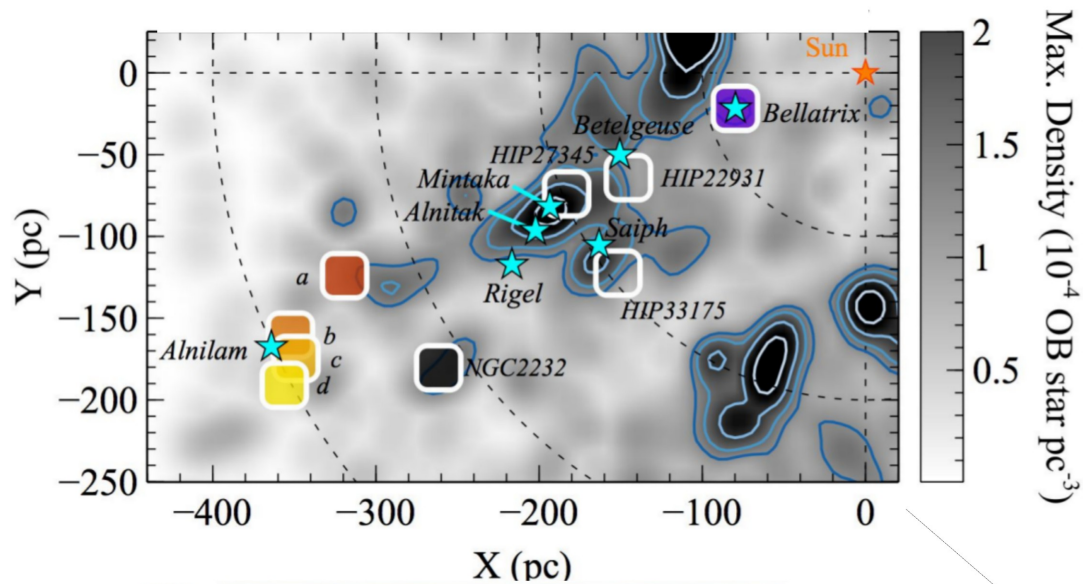
- oblique impact of high velocity cloud on the Galactic Disk  
(Comeron & Torra, 1992; Comeron et al., 1998)
- cascades of supernova explosions  
(Poppel, 1997)



Adapted from de Zeeuw et al . (1999)

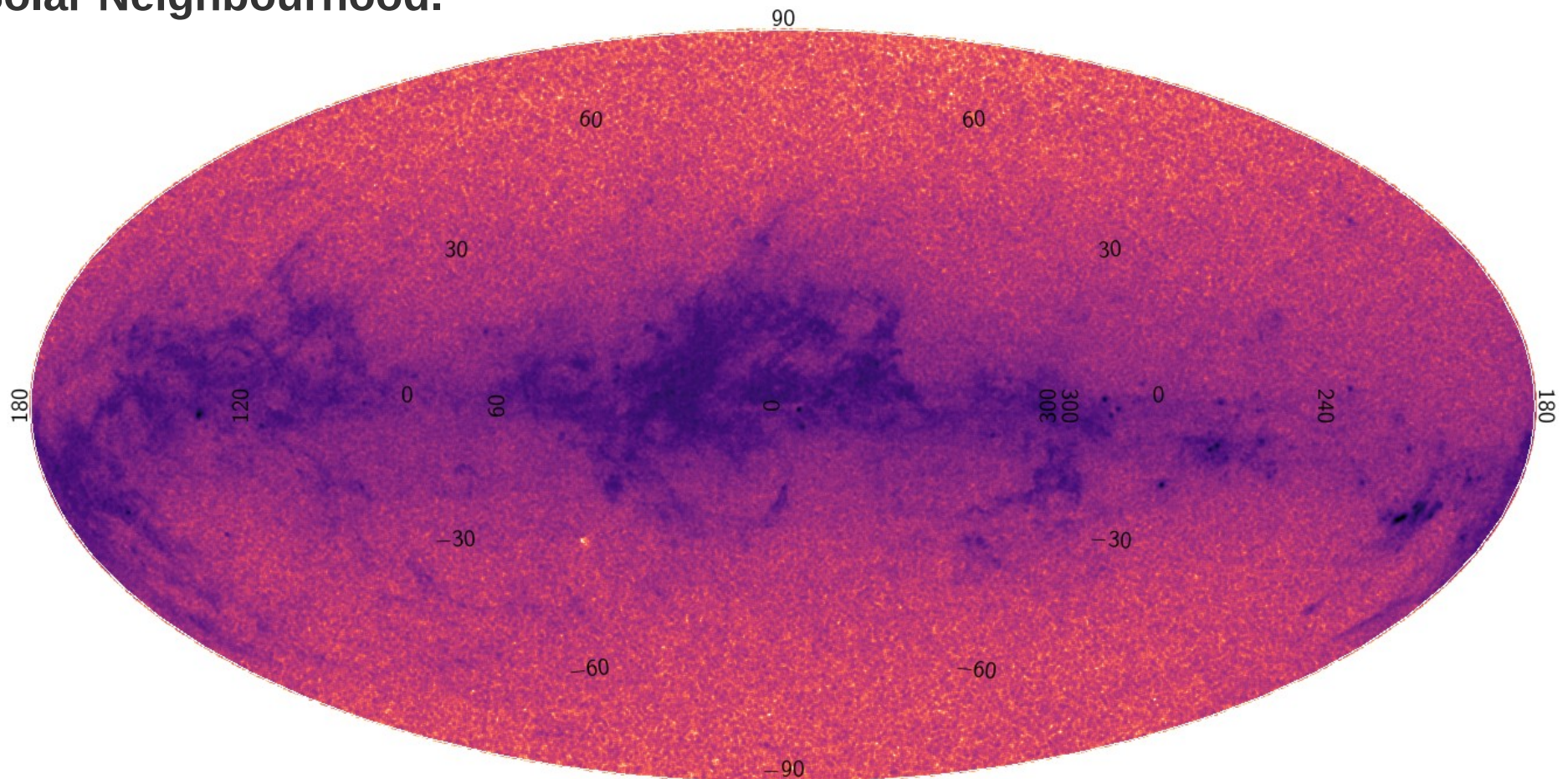


# The Gould Belt



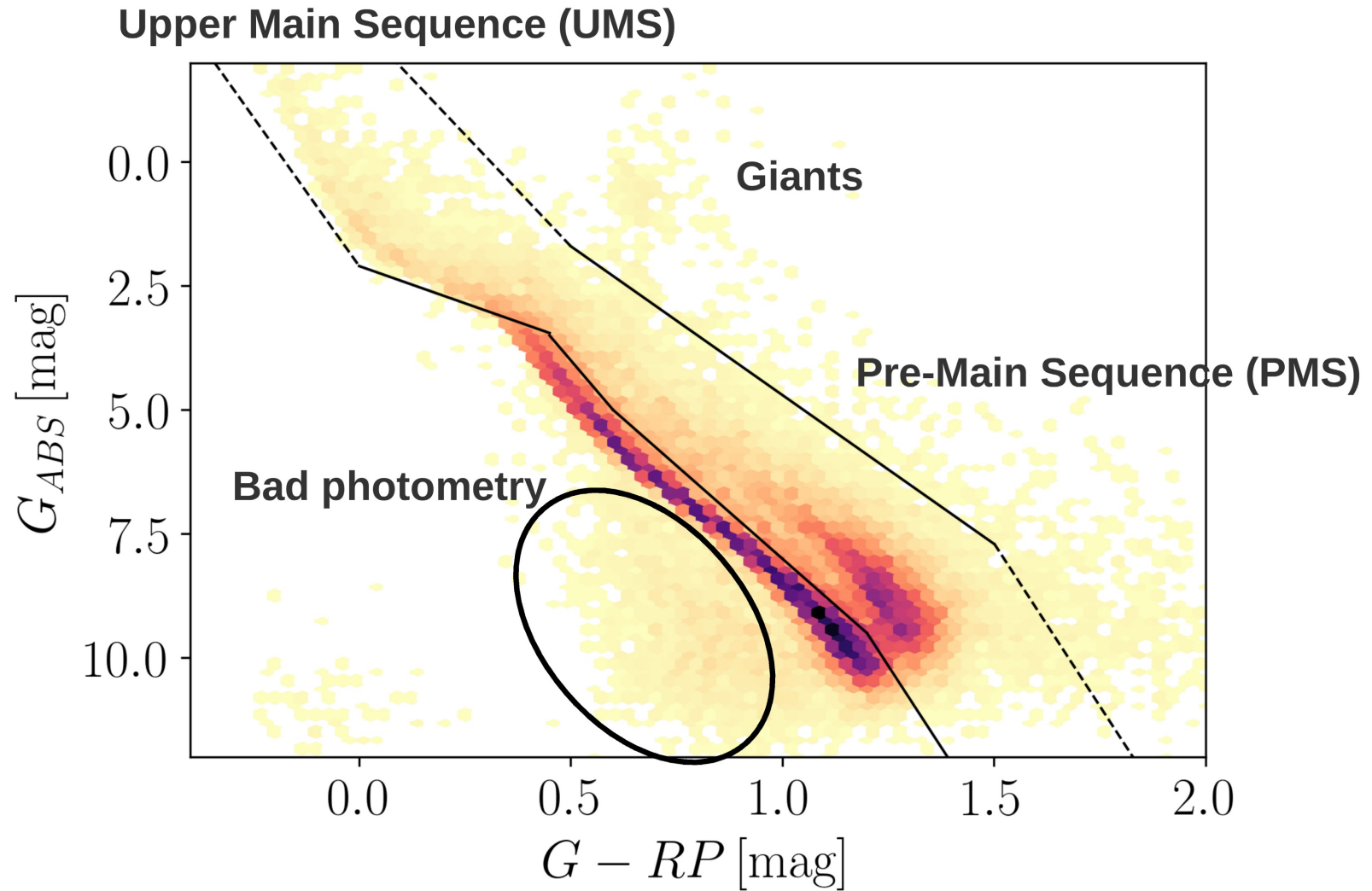
# Goals

- trace the three dimensional configuration of the Solar Neighbourhood, focusing on young groups and OB associations.
- derive the kinematic properties and the star formation history of the Solar Neighbourhood.



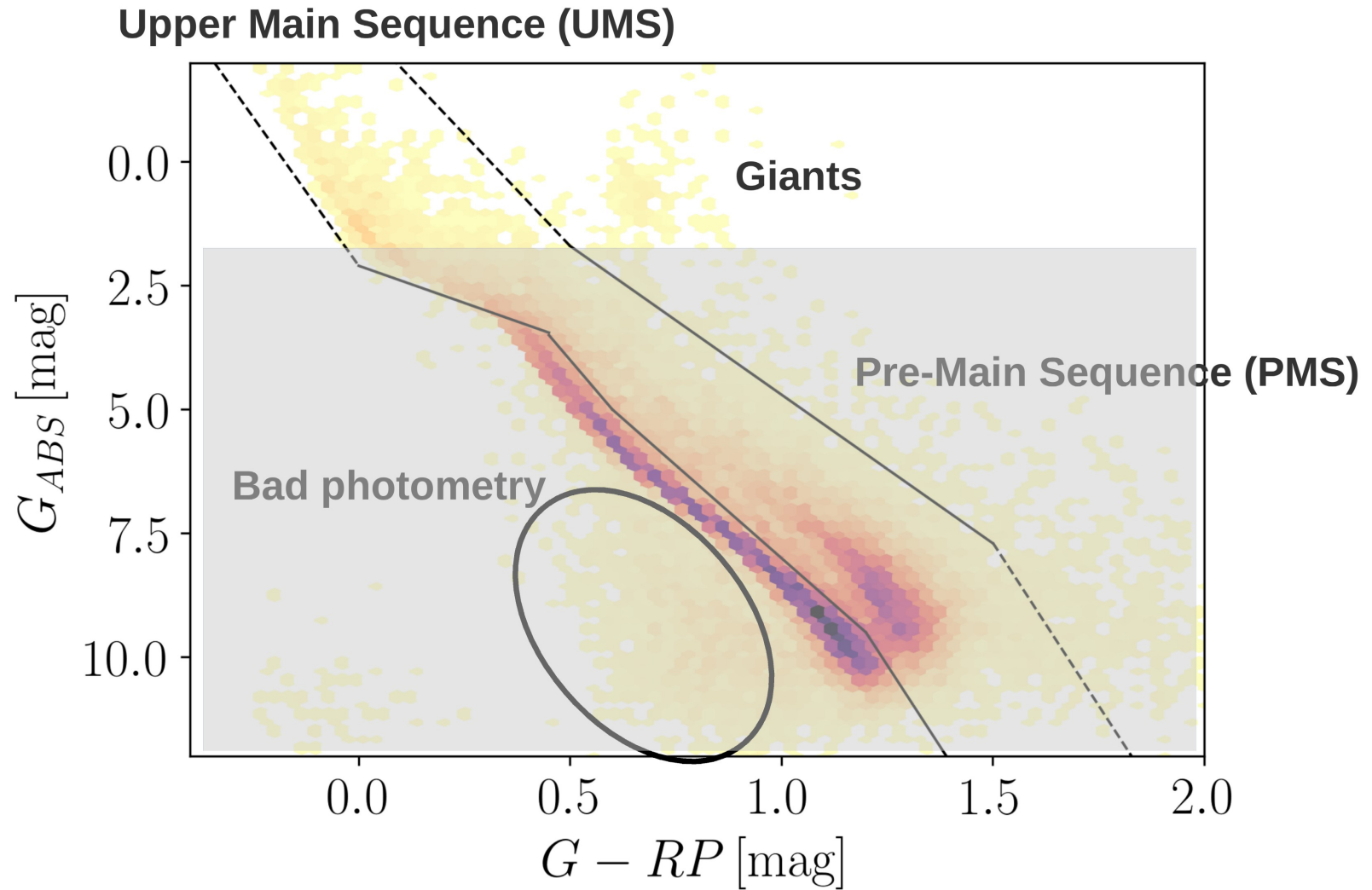


# Selecting young stars in Gaia



Colour-magnitude diagram of the Orion region

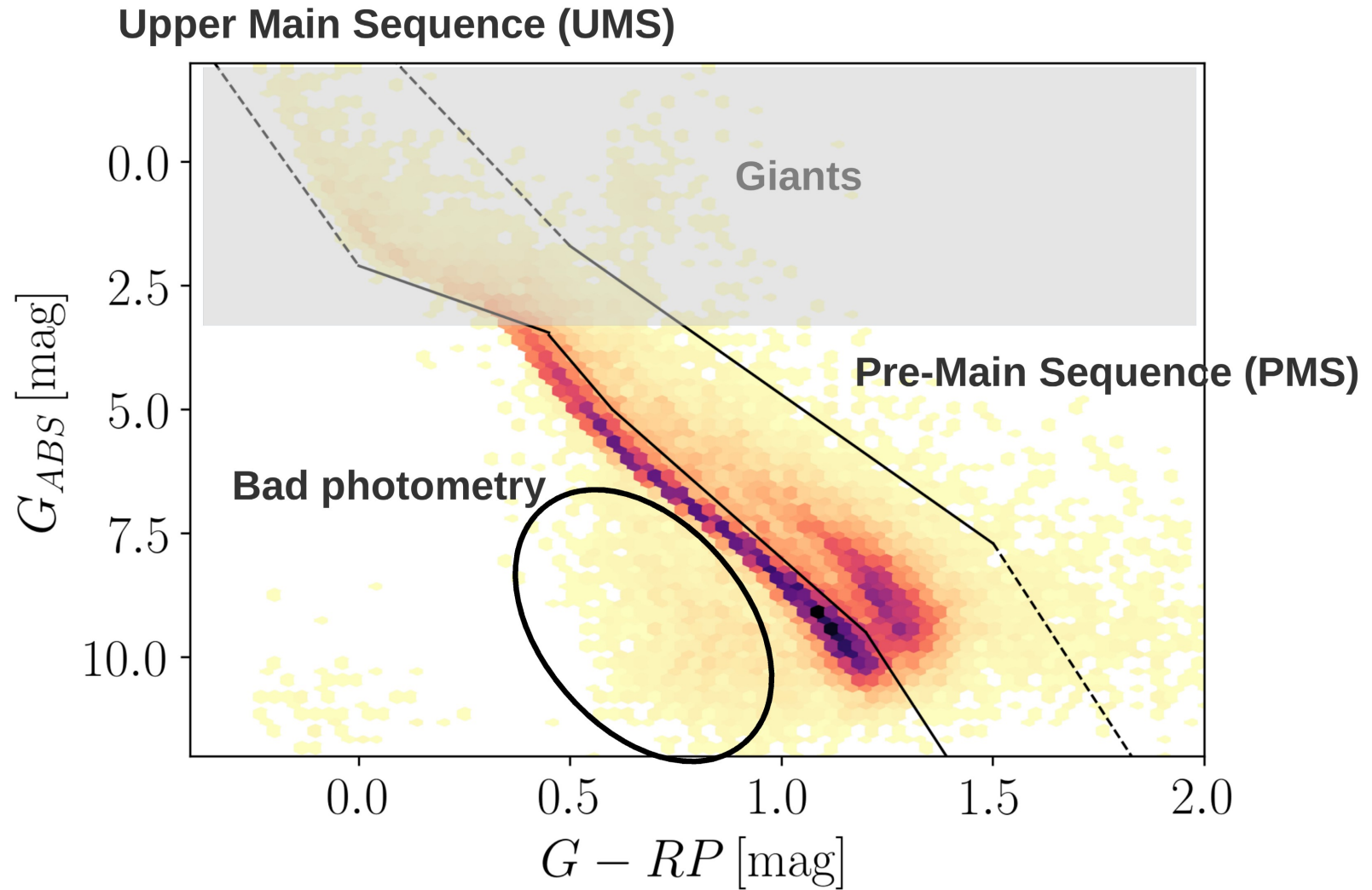
# Selecting young stars in Gaia: UMS



Colour-magnitude diagram of the Orion region

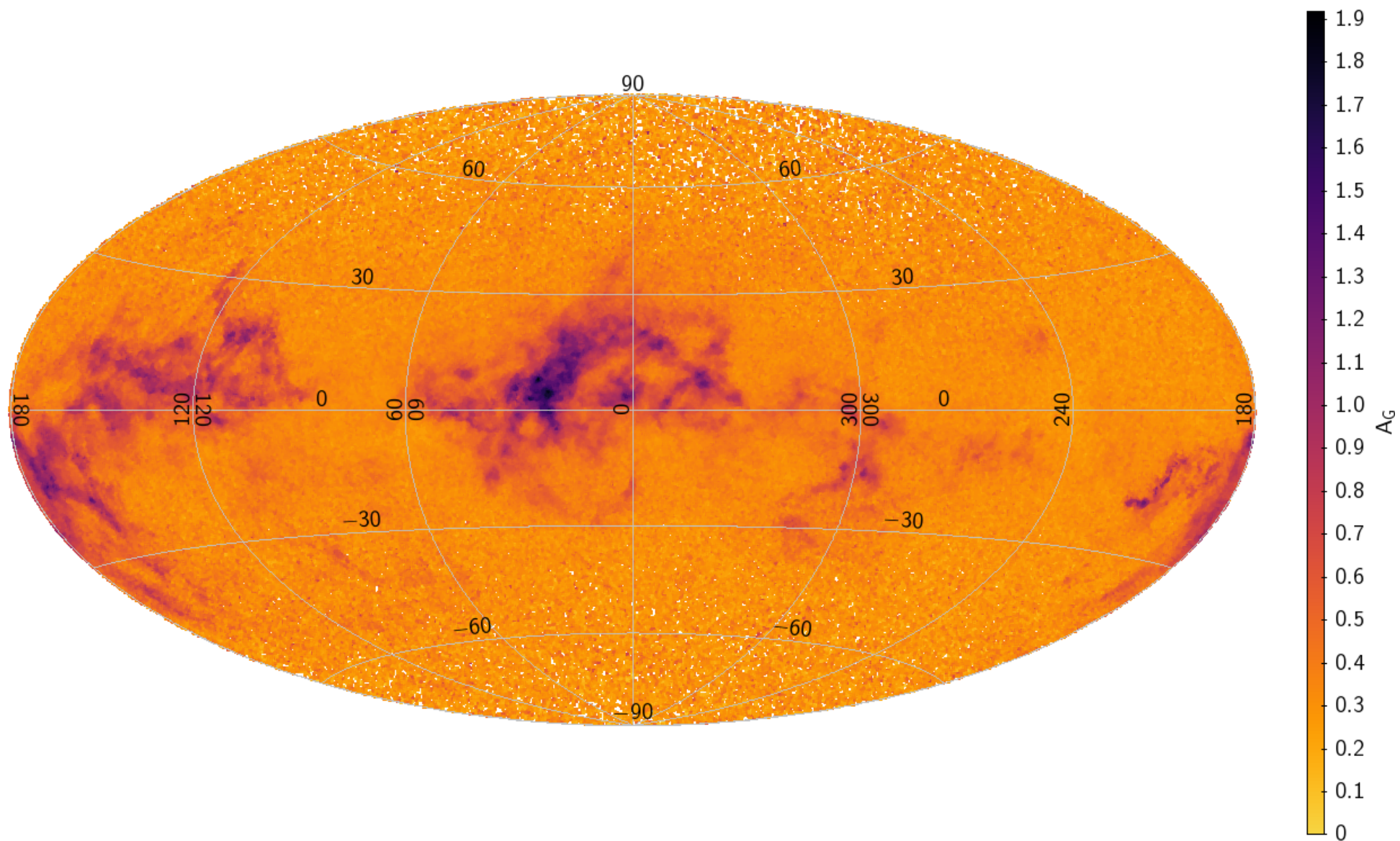


# Selecting young stars in Gaia: PMS



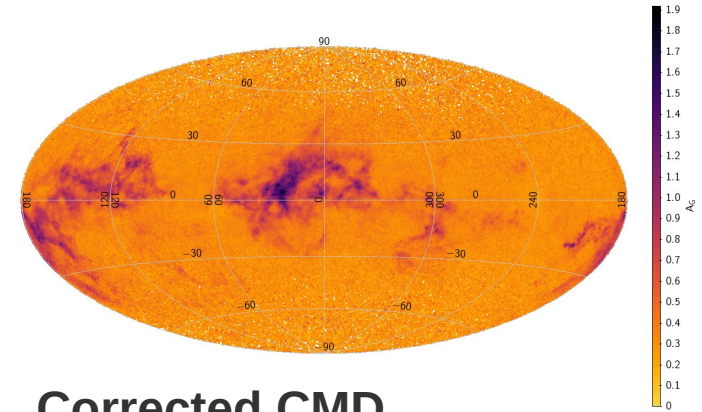
Colour-magnitude diagram of the Orion region

# Extinction correction

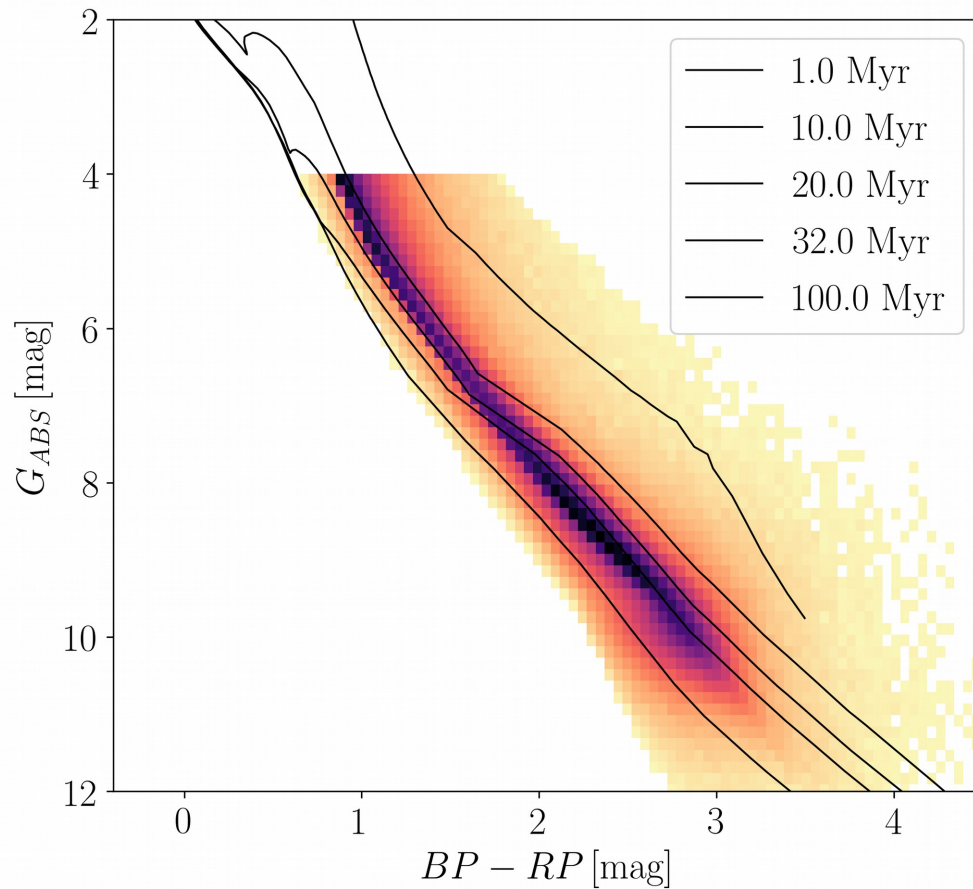




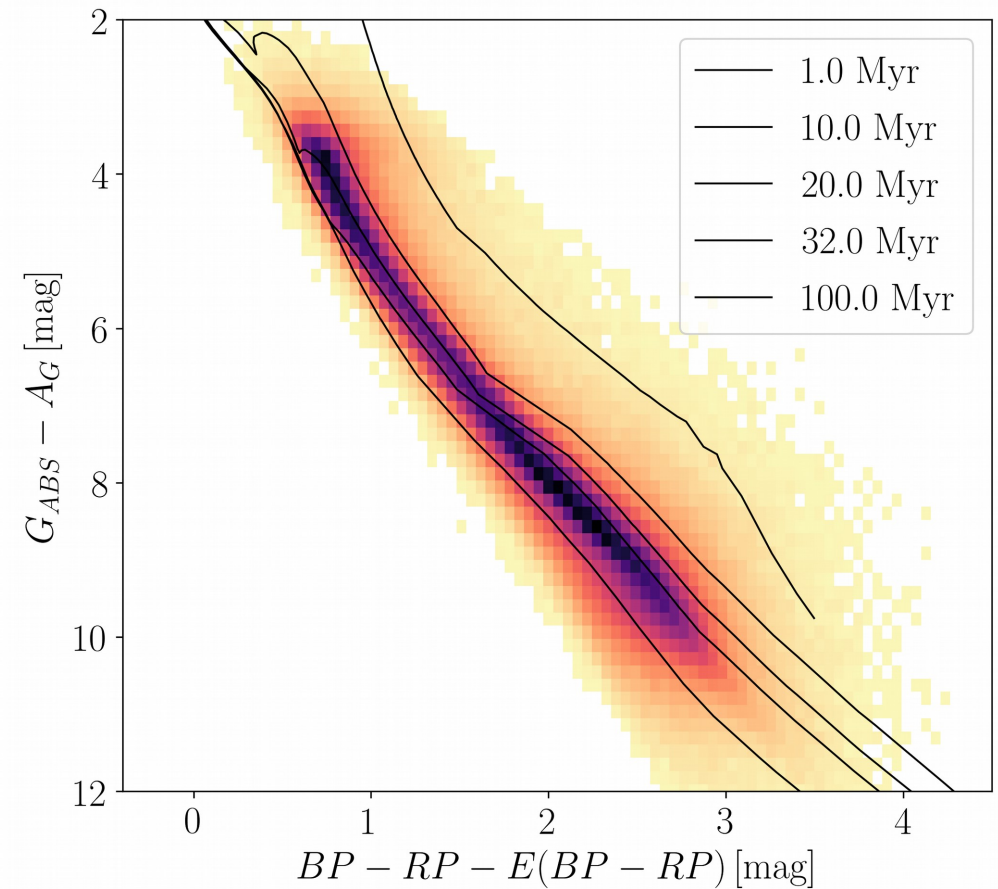
# Extinction correction



Observed CMD



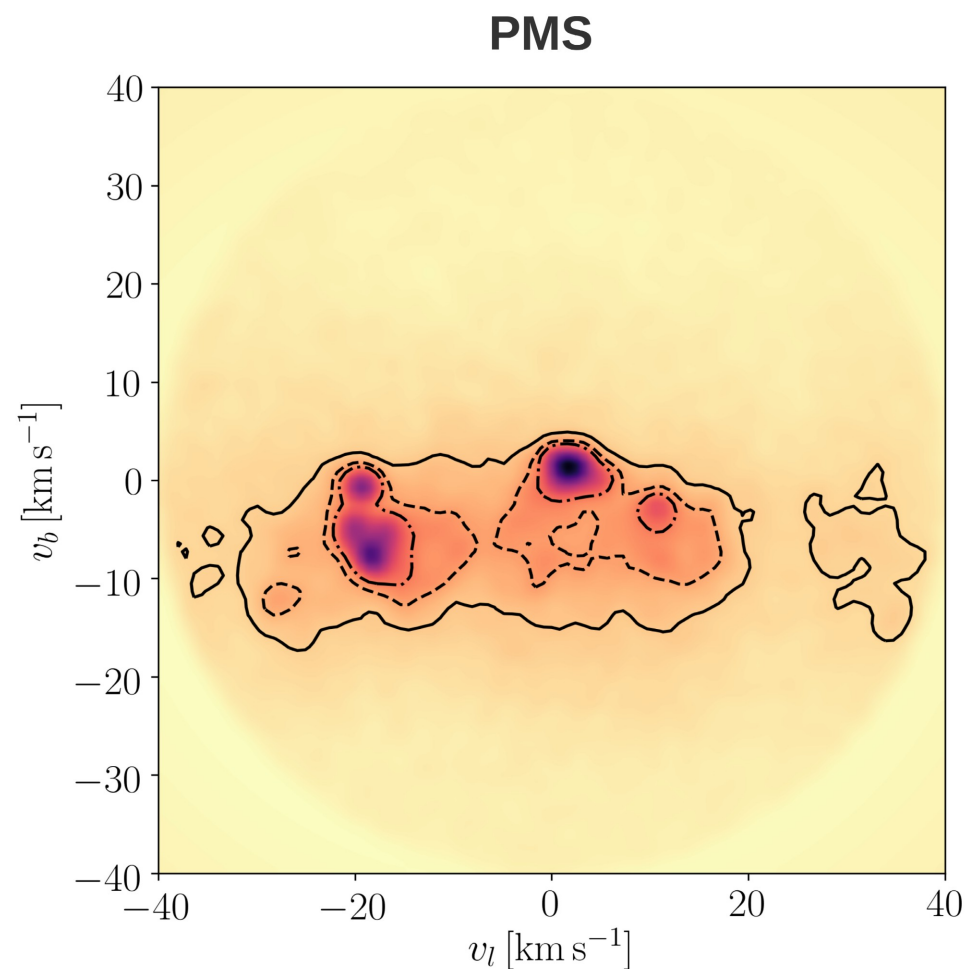
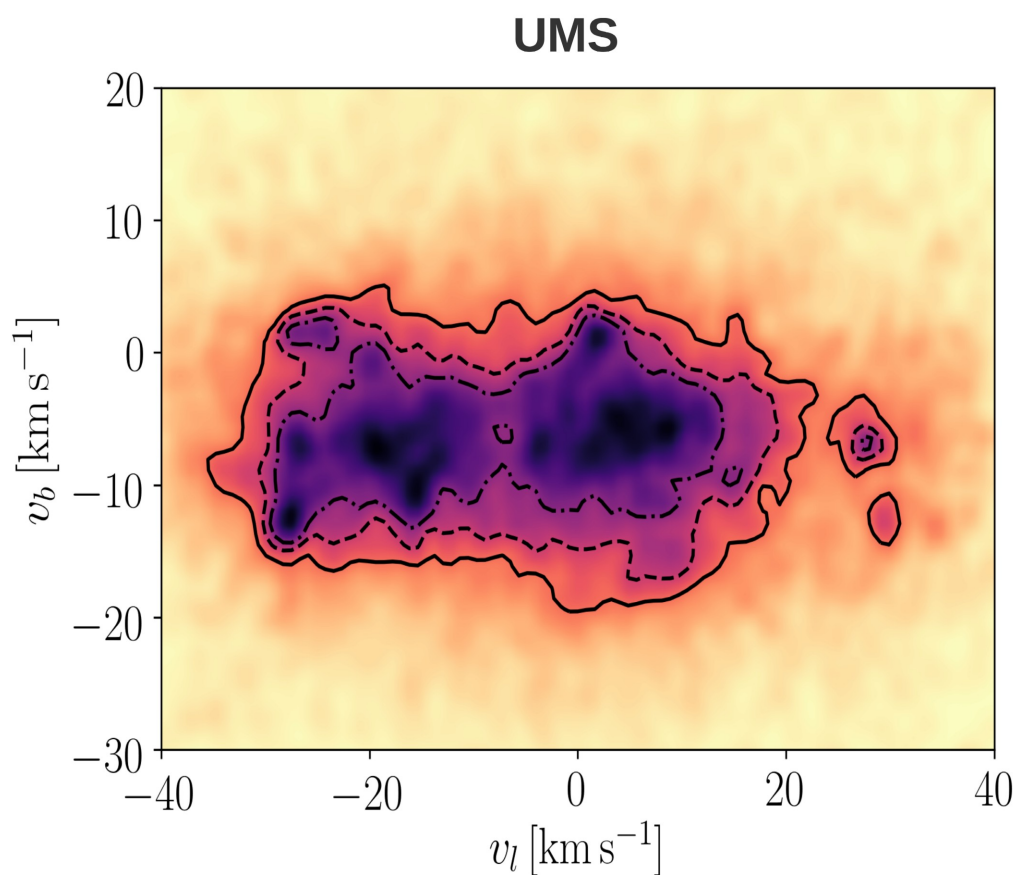
Corrected CMD



We select stars younger than 20 Myr

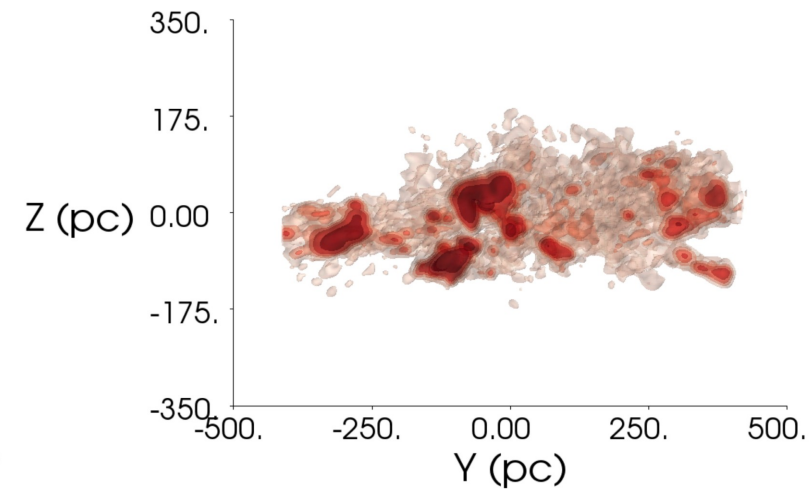
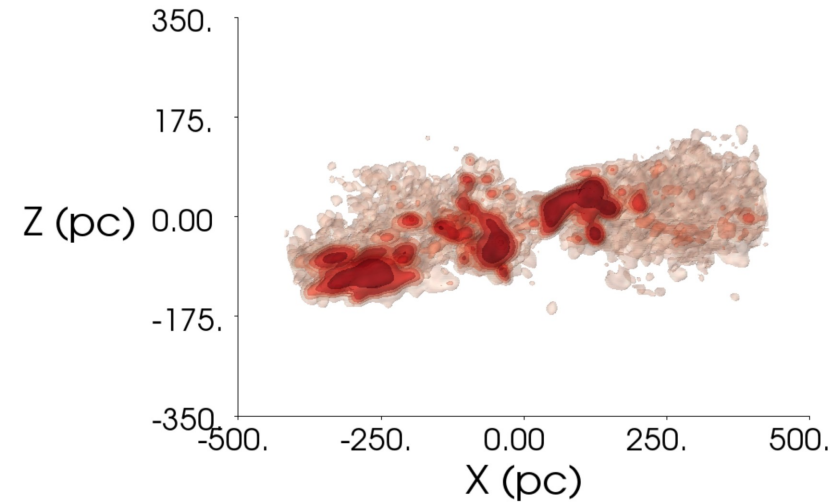
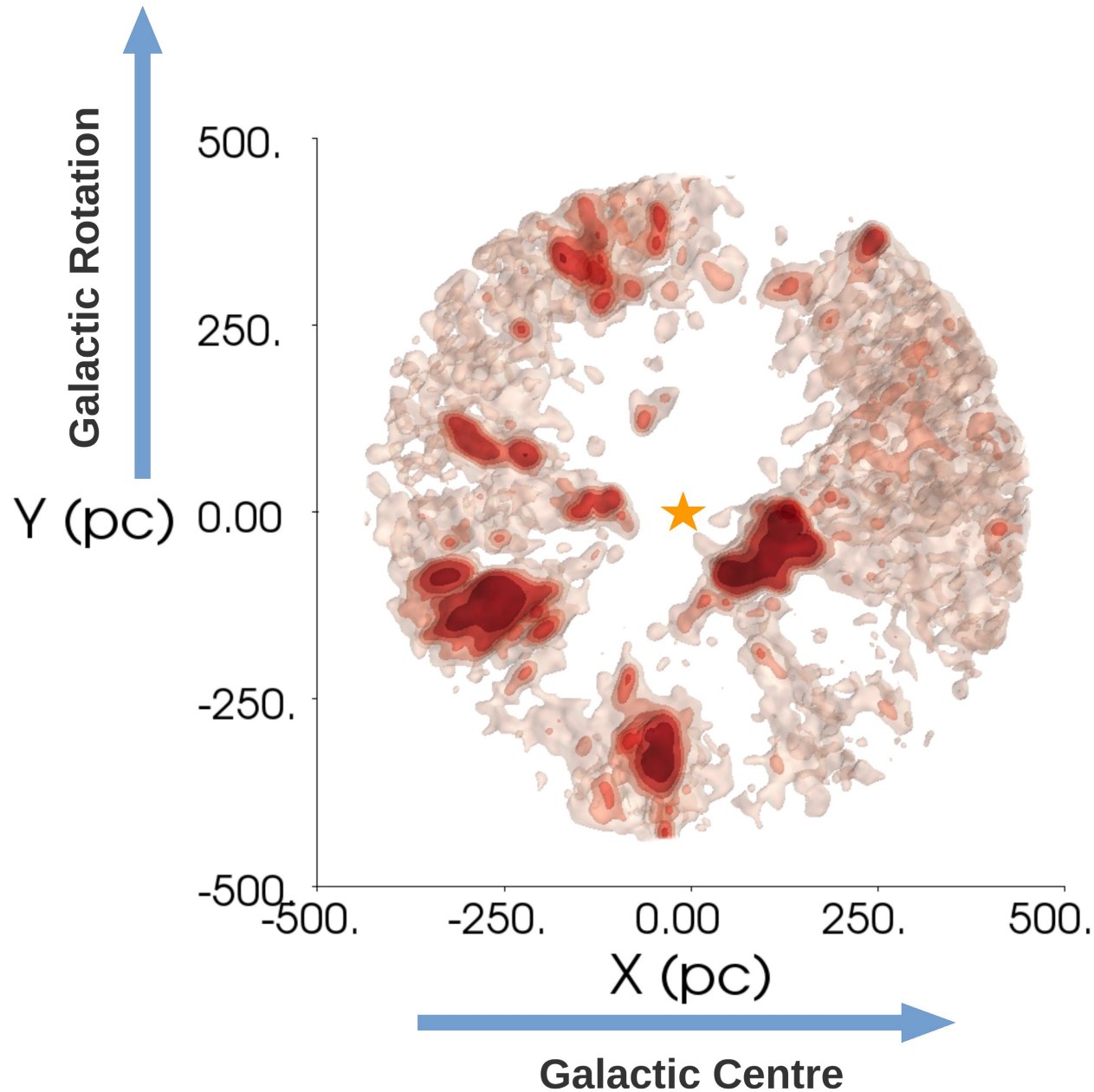
# Tangential velocities

Members of clusters and associations share the same spatial velocity + small velocity dispersion.

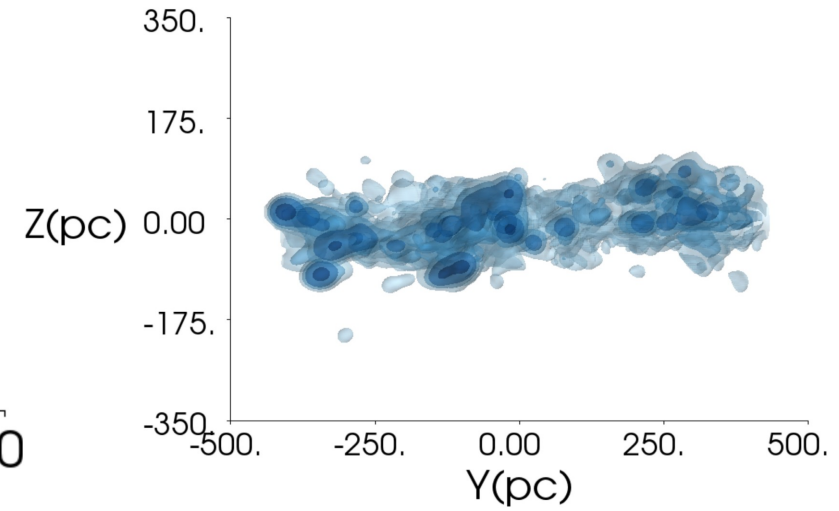
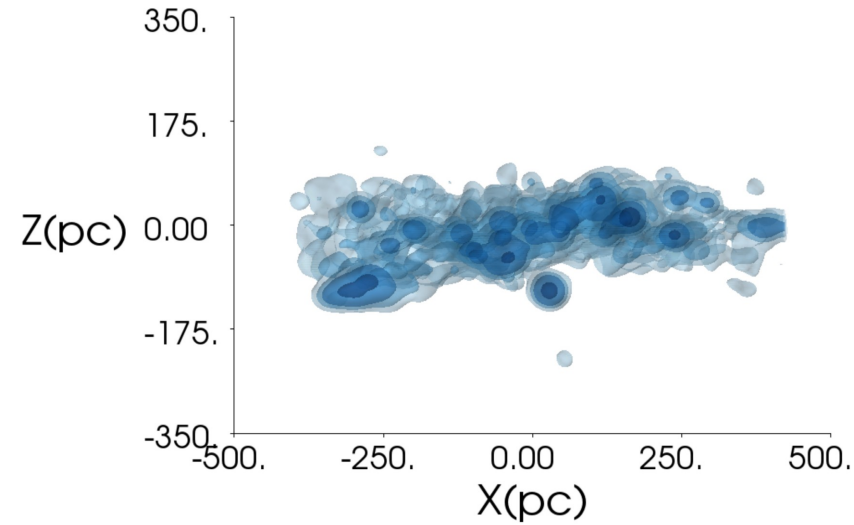
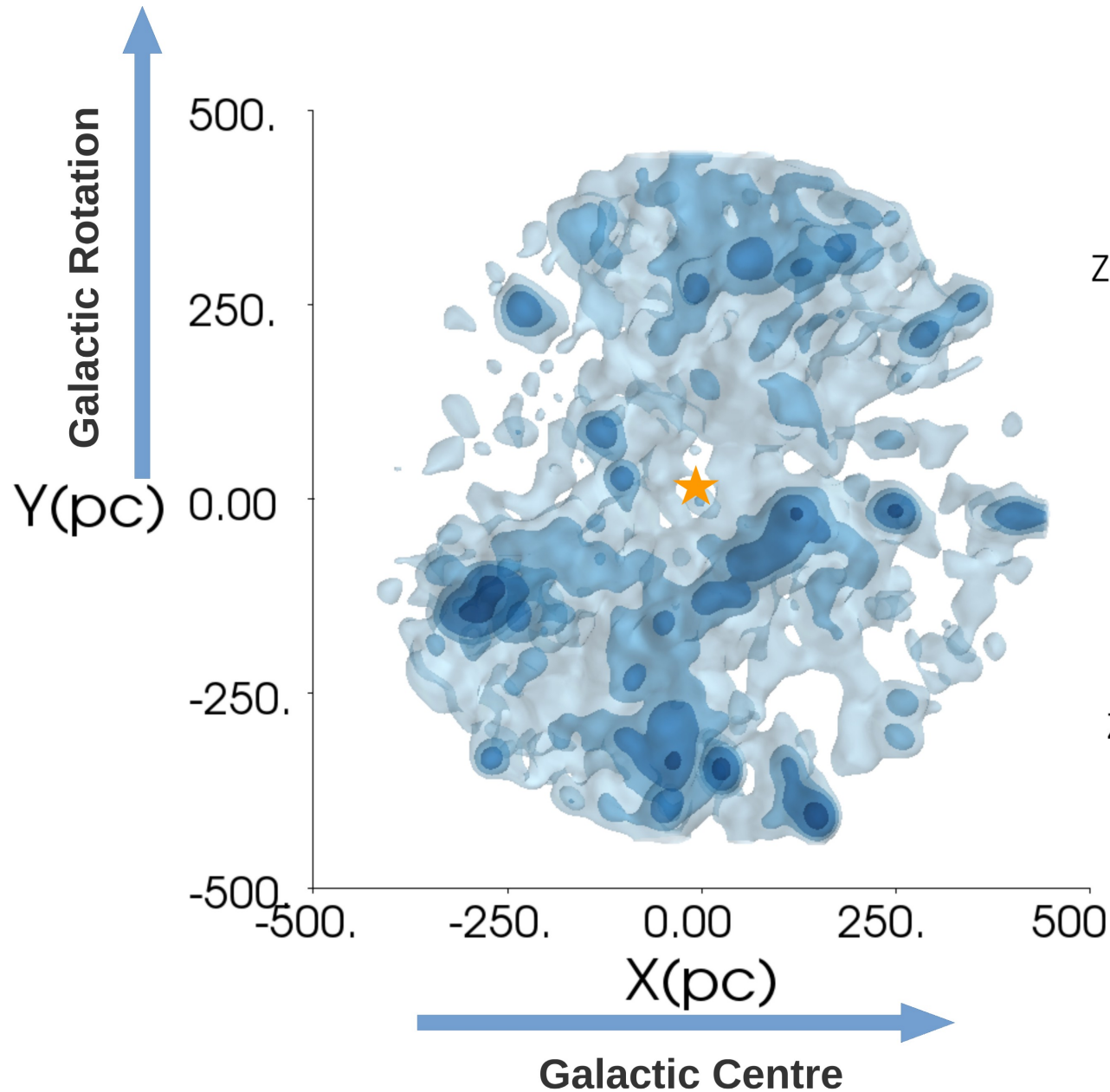




# 3D mapping of PMS stars

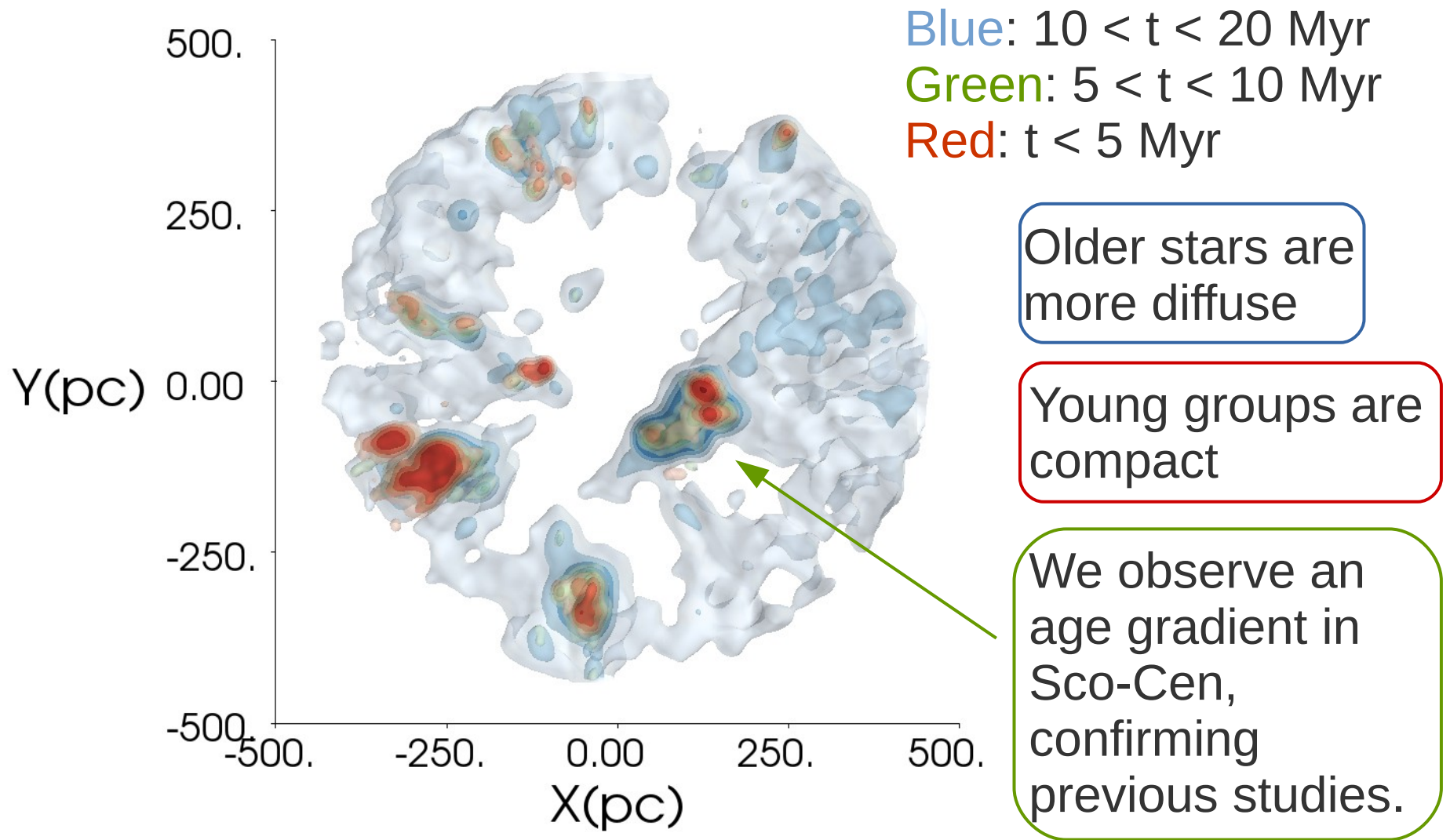


# 3D mapping of UMS stars





# Ages of PMS stars



# (Preliminary) Conclusions

We combined Gaia DR2 astrometry and photometry to study the 3D configuration of young stars within  $d = 500$  pc.



We create 3D density maps of UMS and PMS stars.

Check this out! <http://galaxymap.org/dr2/>



Three main structures are visible:  
Sco-Cen, Vela, and Orion  
(and other smaller density enhancements).



We study the ages of PMS sources  
confirming previous results.

# (Preliminary) Conclusions

We combined Gaia DR2 astrometry and photometry to study the 3D configuration of young stars within  $d = 500$  pc.



We create 3D density maps of UMS and PMS stars.

Check this out! <http://galaxymap.org/dr2/>



Three main structures are visible:  
Sco-Cen, Vela, and Orion  
(and other smaller density enhancements).



We study the ages of PMS sources  
confirming previous results.

**Is there a Gould Belt?**



# (Preliminary) Conclusions

We combined Gaia DR2 astrometry and photometry to study the 3D configuration of young stars within  $d = 500$  pc.



We create 3D density maps of UMS and PMS stars.

Check this out! <http://galaxymap.org/dr2/>



Three main structures are visible:  
Sco-Cen, Vela, and Orion  
(and other smaller density enhancements).



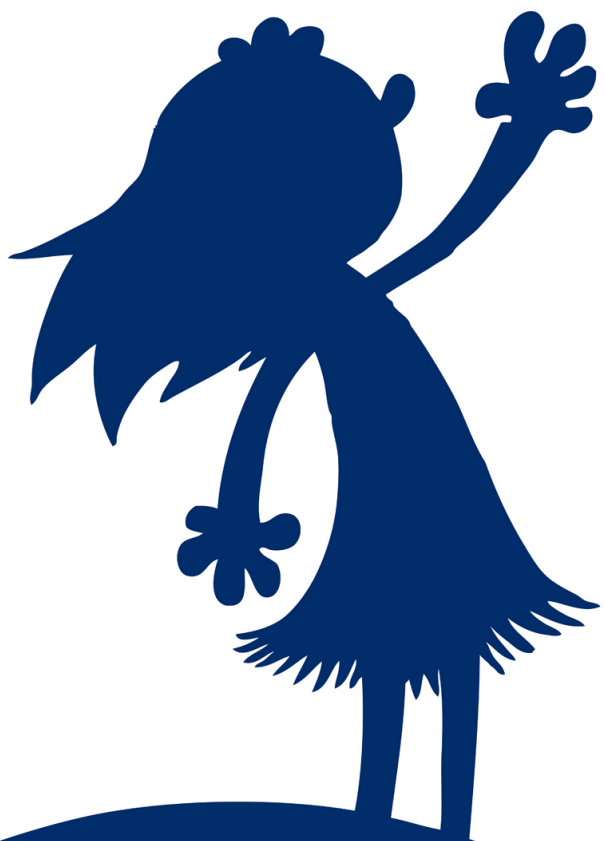
We study the ages of PMS sources  
confirming previous results.

**Is there a Gould Belt?**

We find no evidence of a Belt-like structure!



**Thank you!**



**gaia**

