

3D mapping of the Solar Neighbourhood with Gaia DR2

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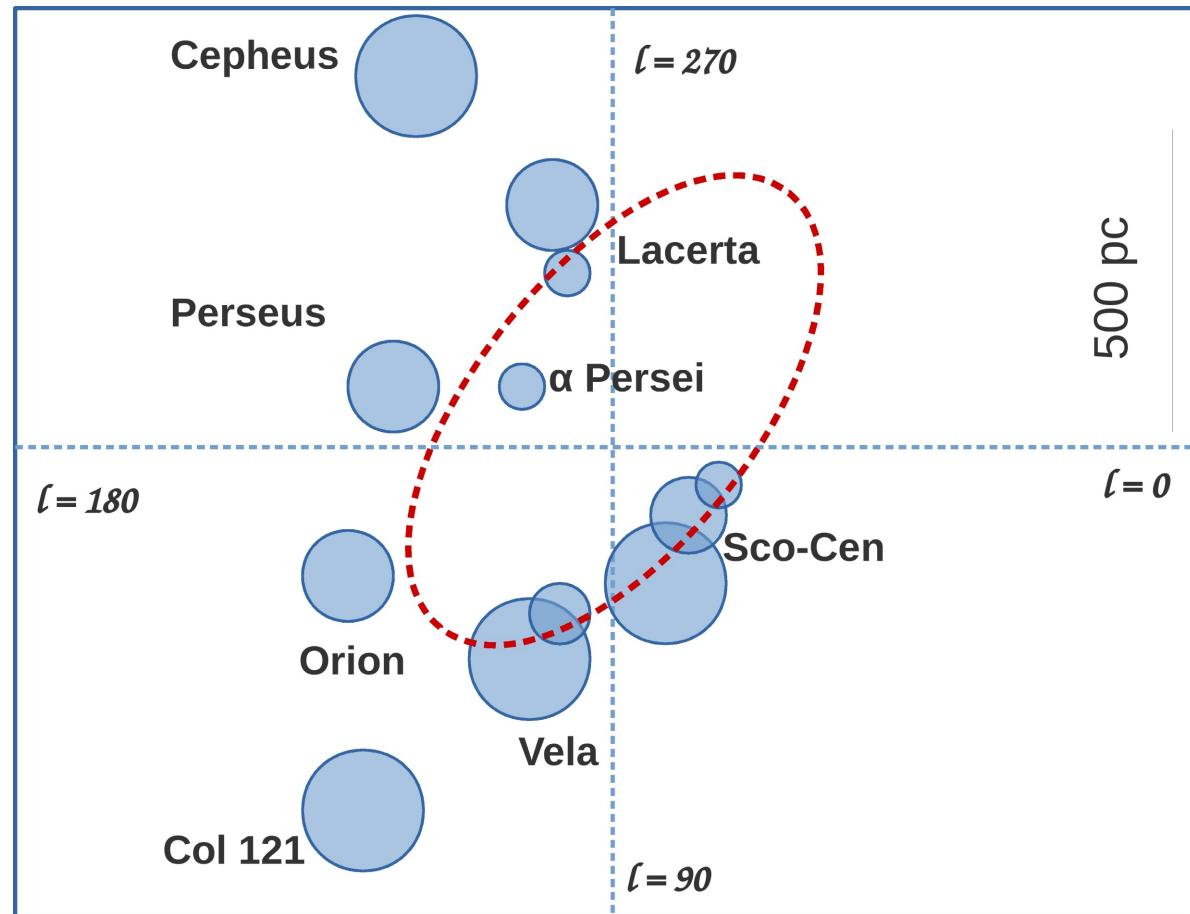
Leiden Observatory

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.

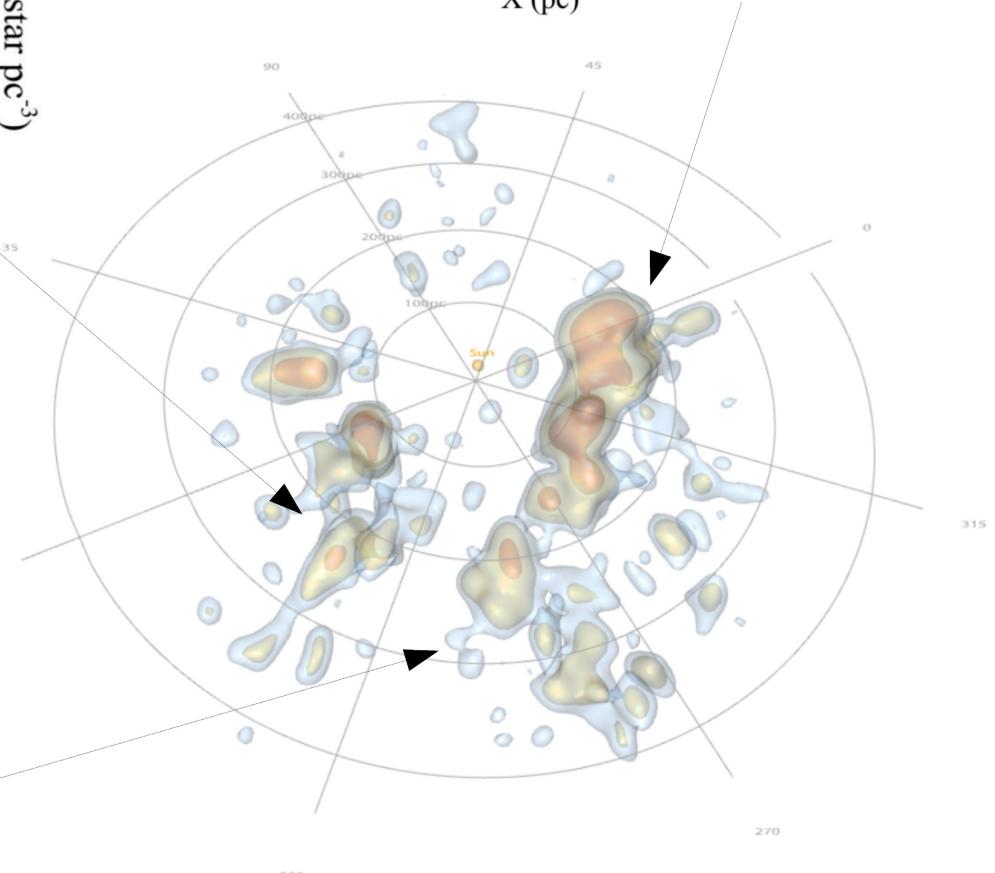
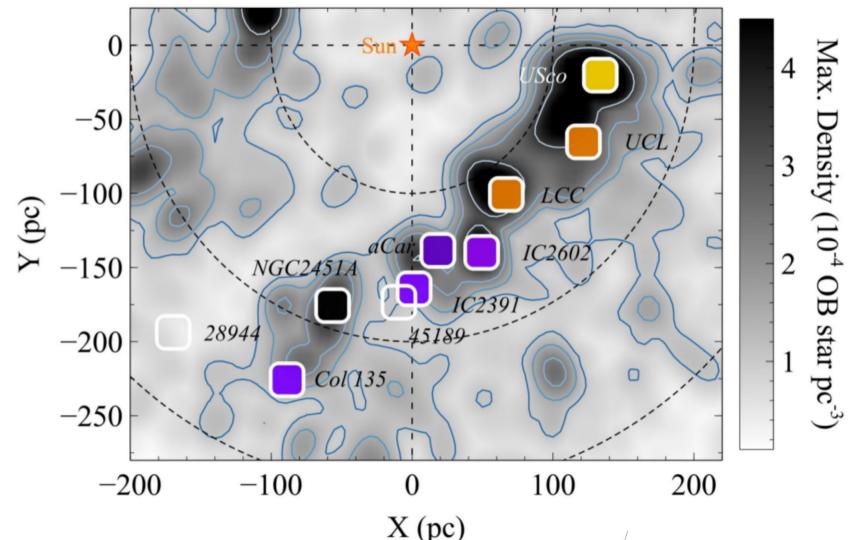
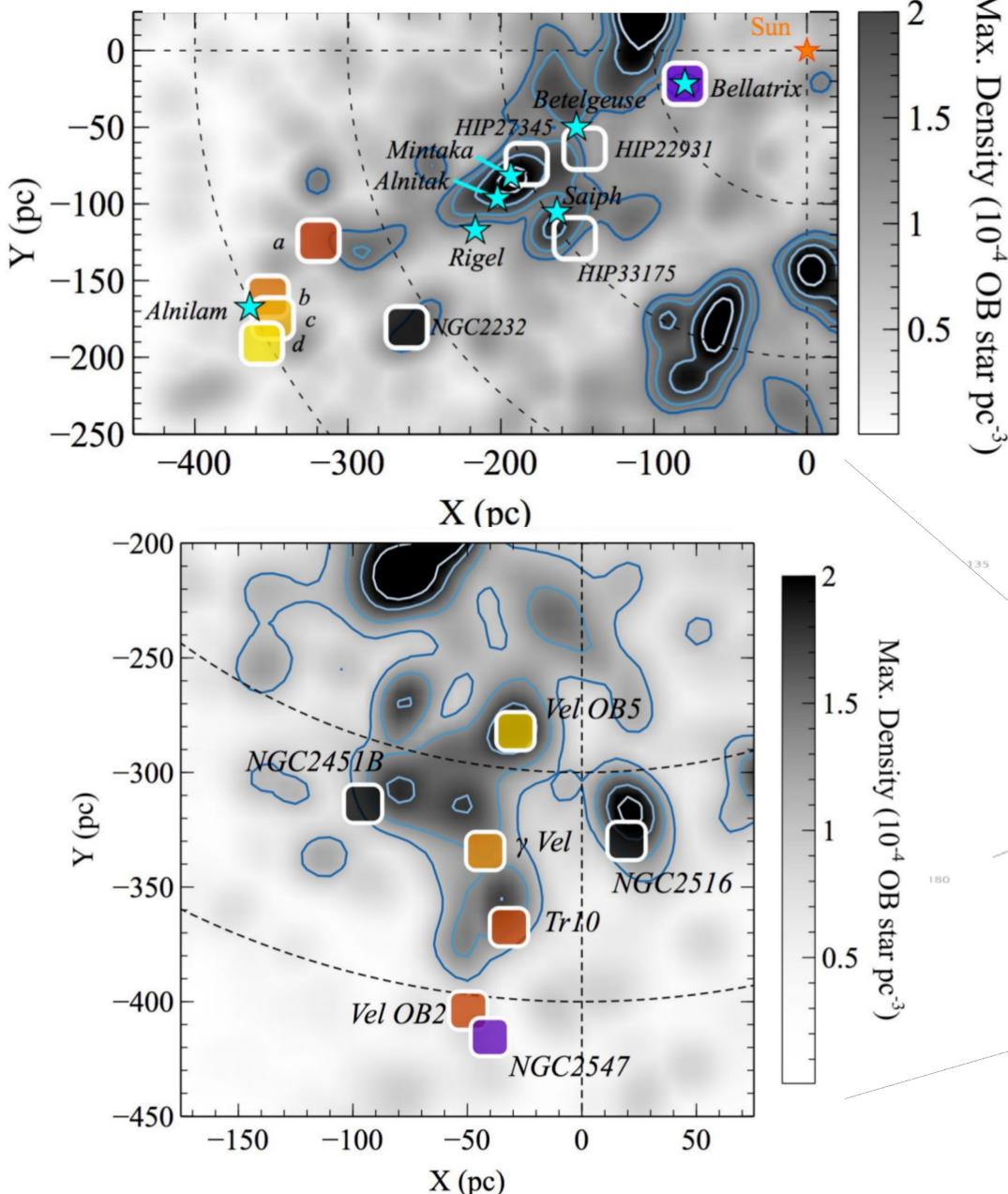
Formation scenarios:

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



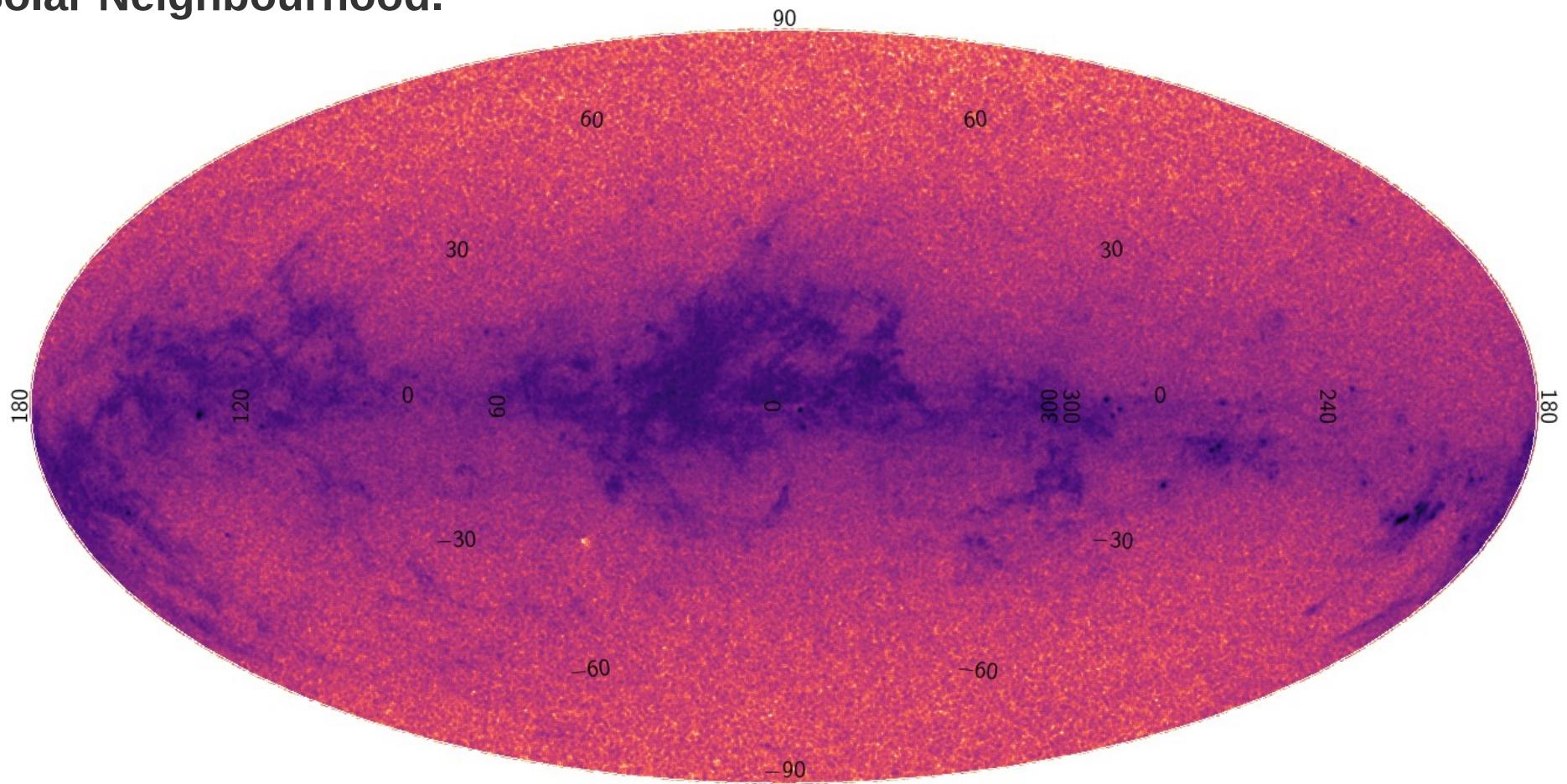
Adapted from de Zeeuw et al . (1999)

The Gould Belt

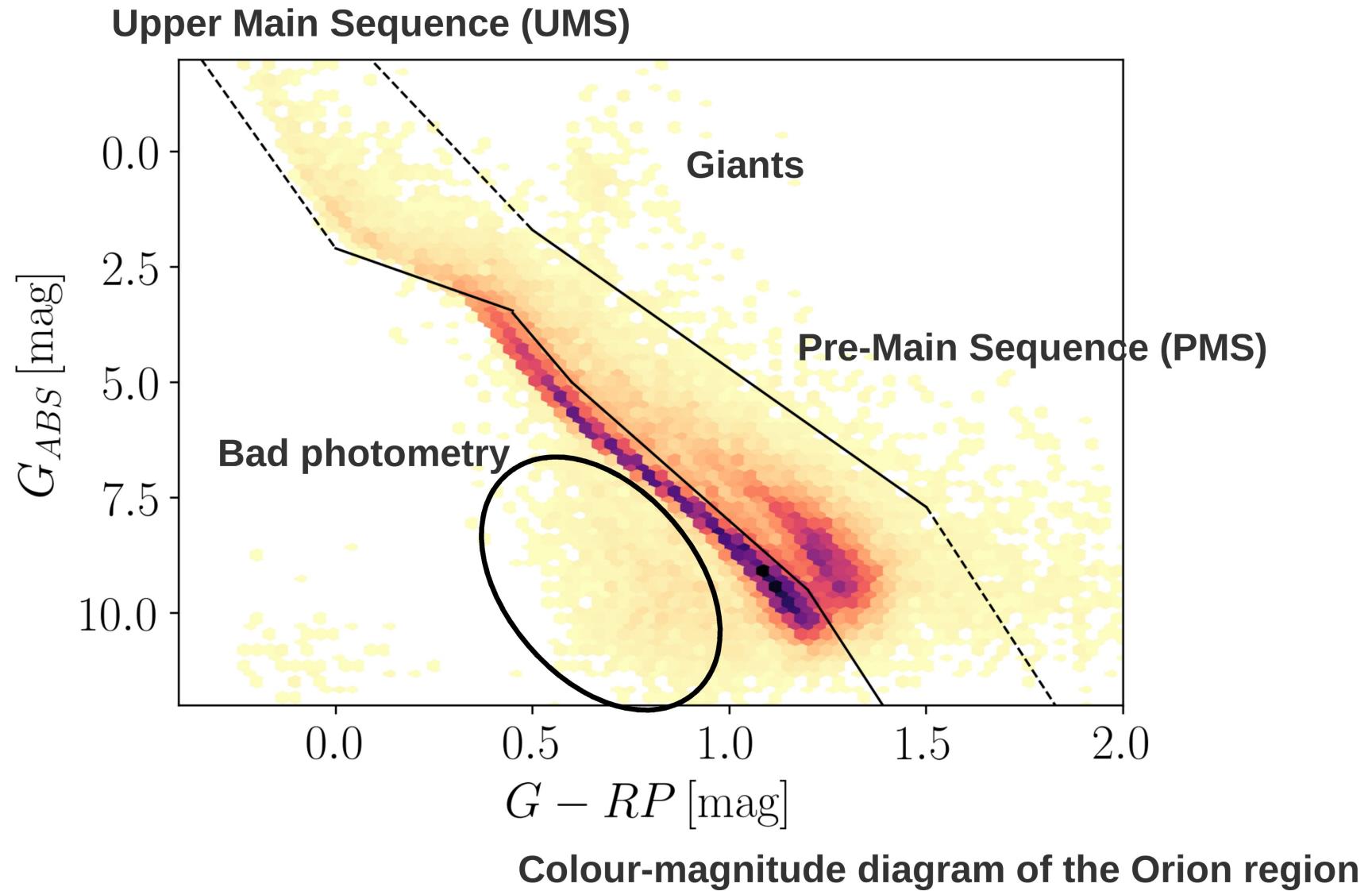


Goals

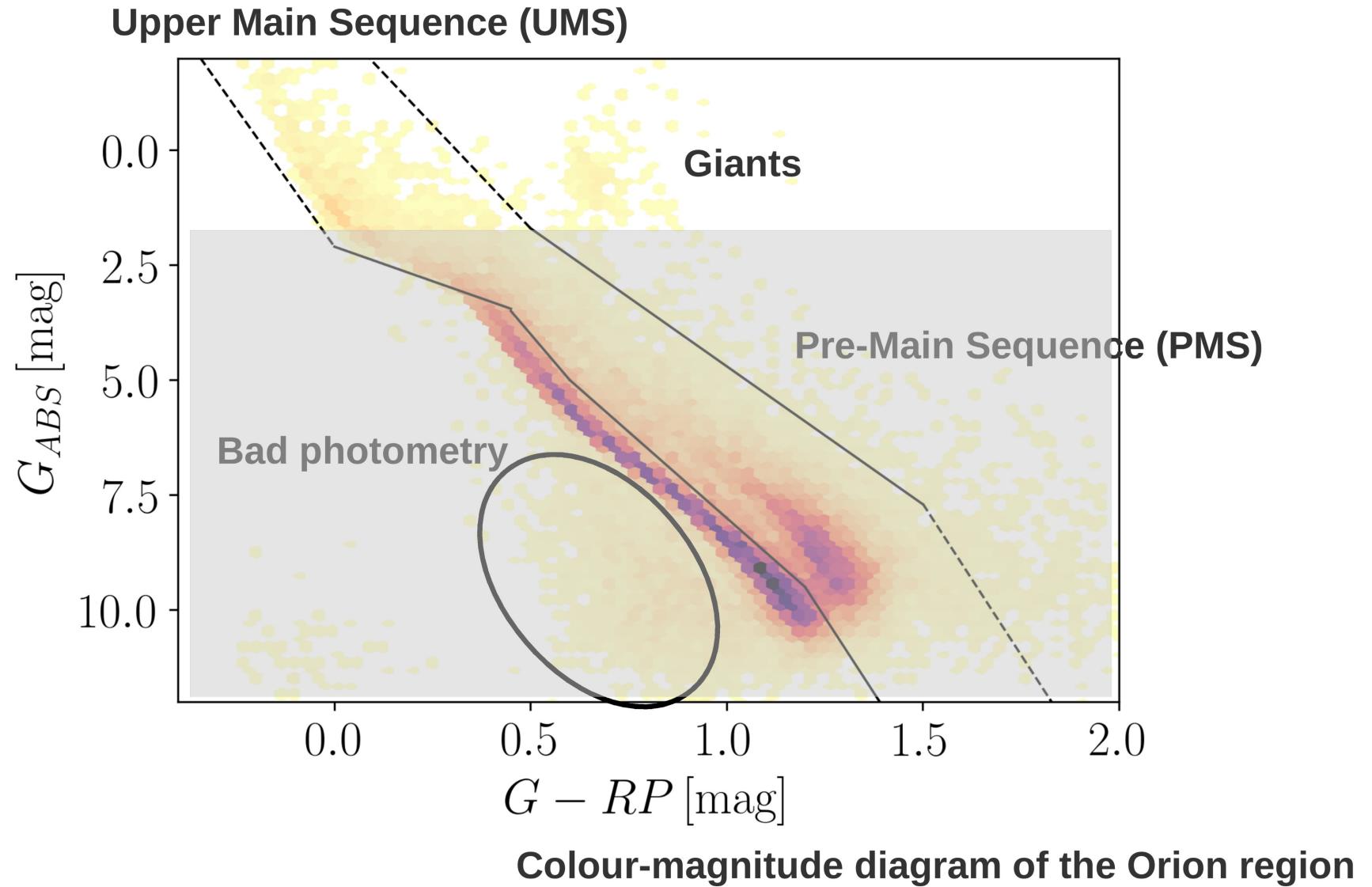
- trace the three dimensional configuration of the Solar Neighbourhood, focusing on young groups and OB associations.
- derive the kinematic properties and the star formation history of the Solar Neighbourhood.



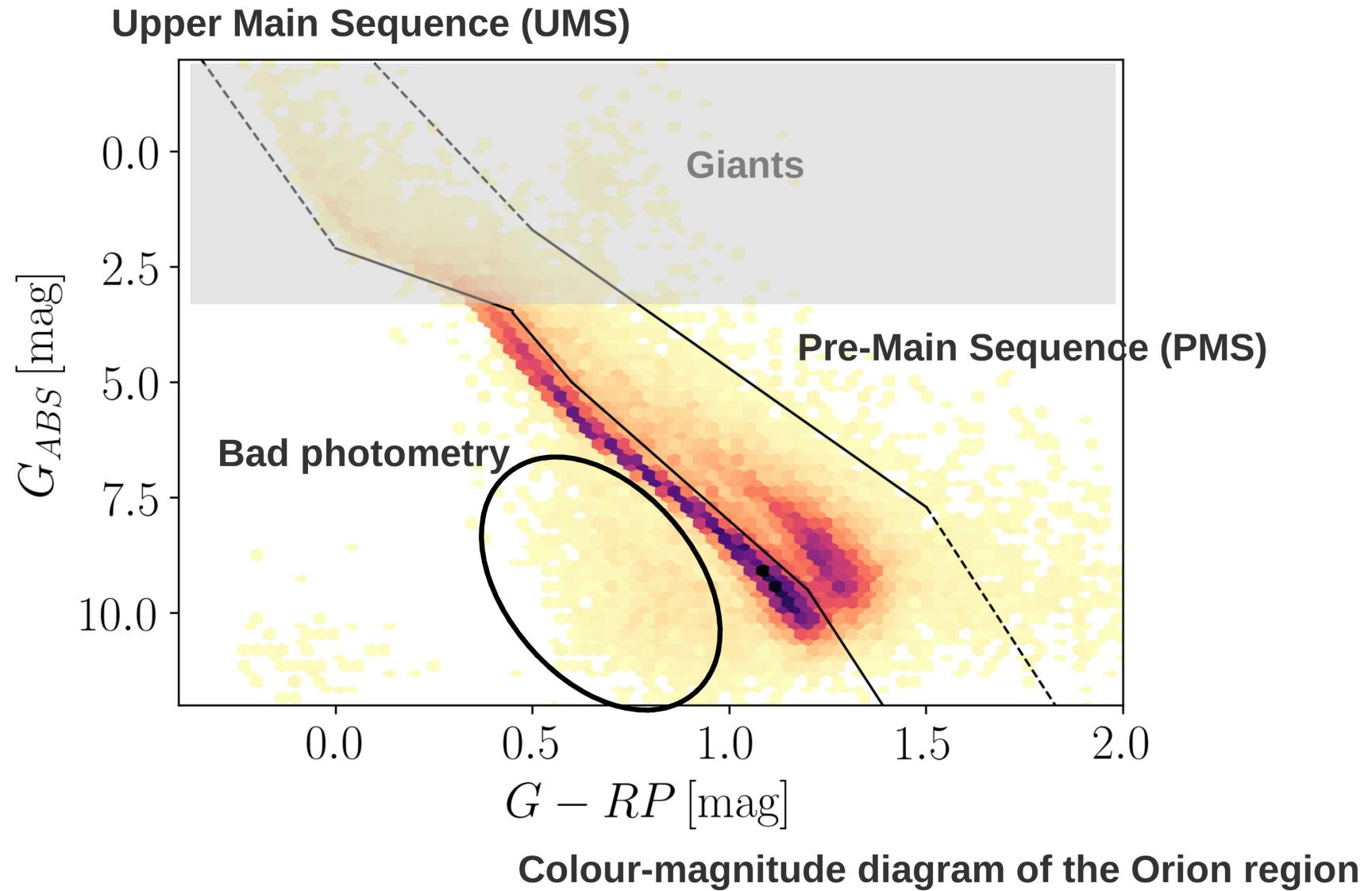
Selecting young stars in Gaia



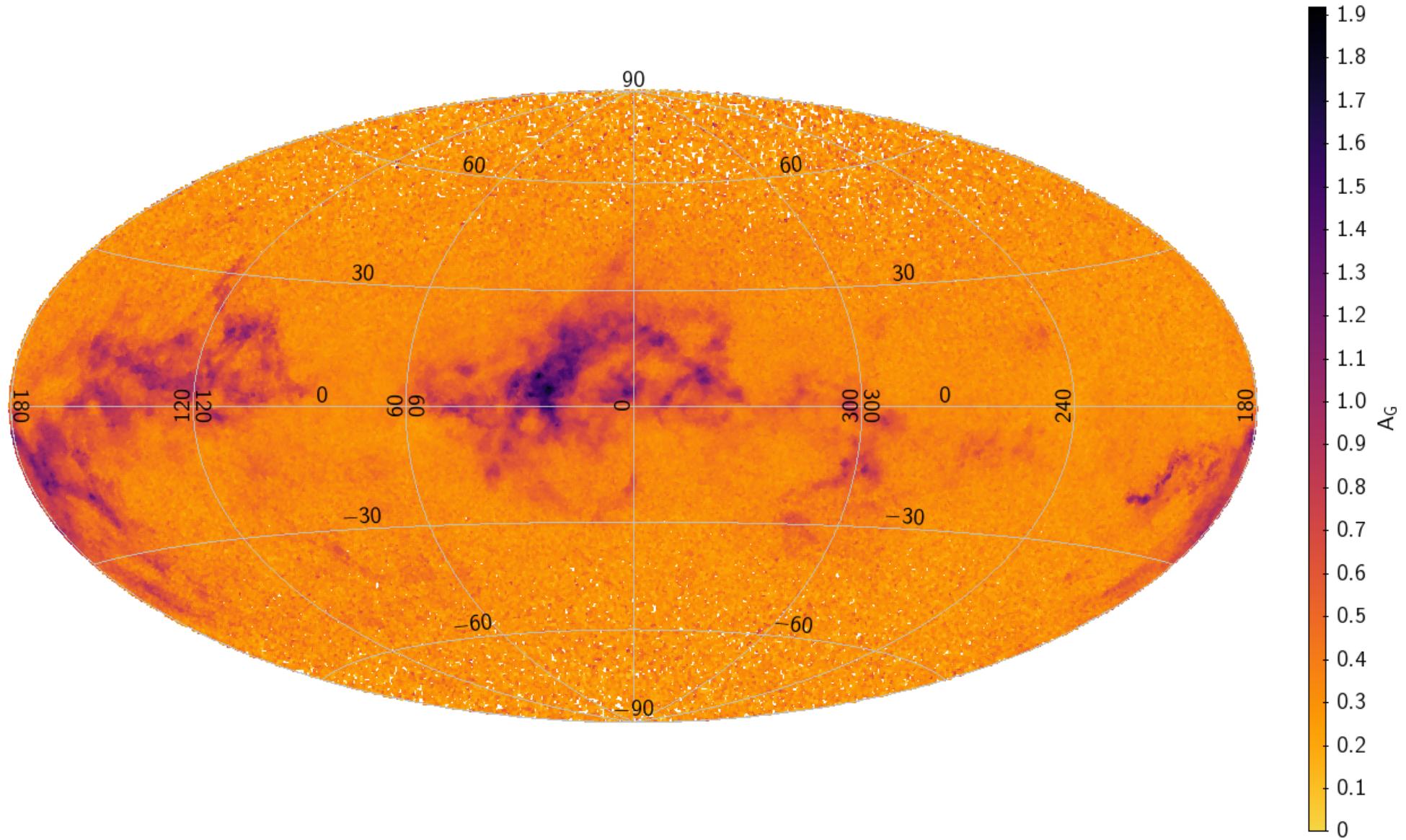
Selecting young stars in Gaia: UMS



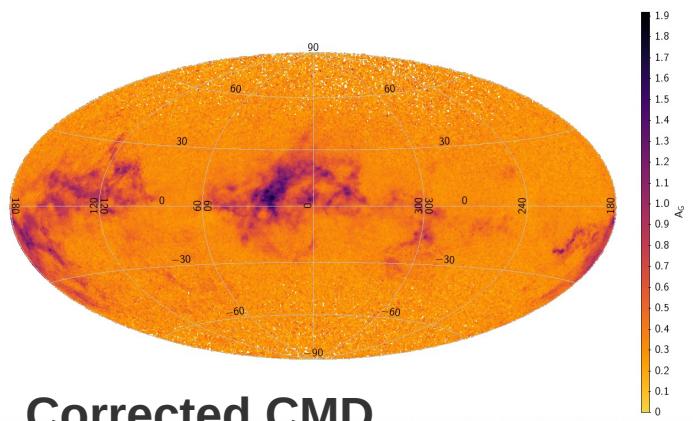
Selecting young stars in Gaia: PMS



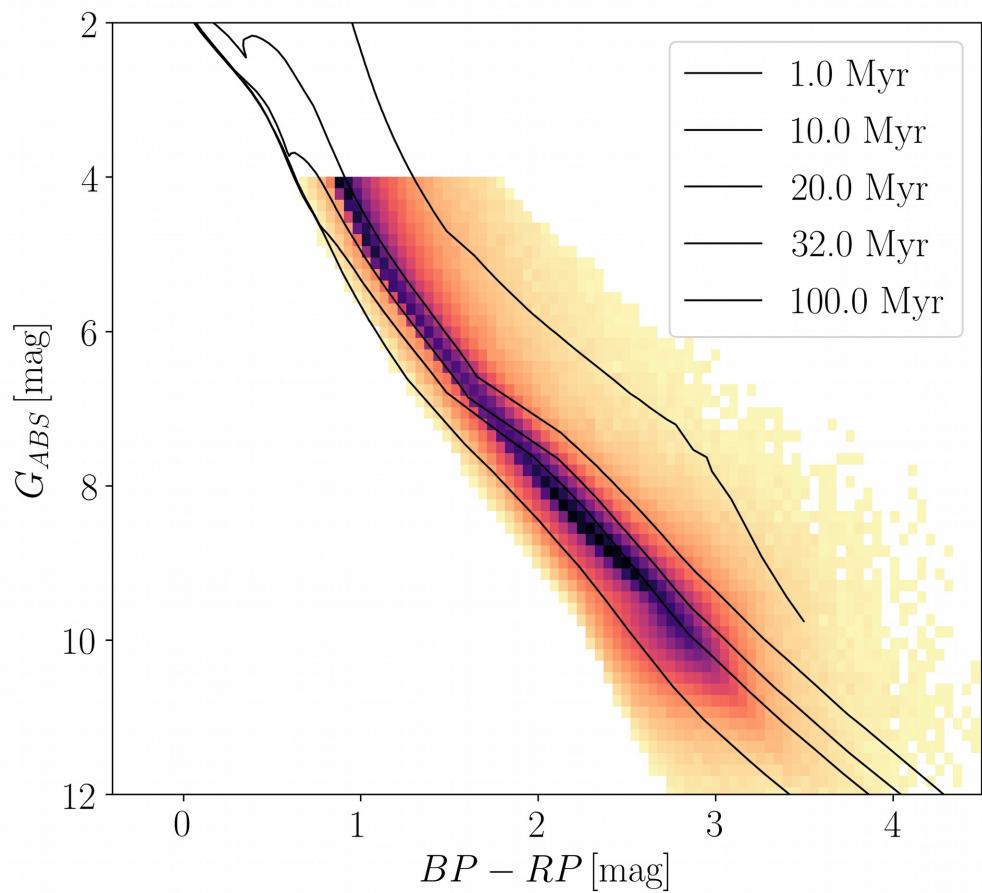
Extinction correction



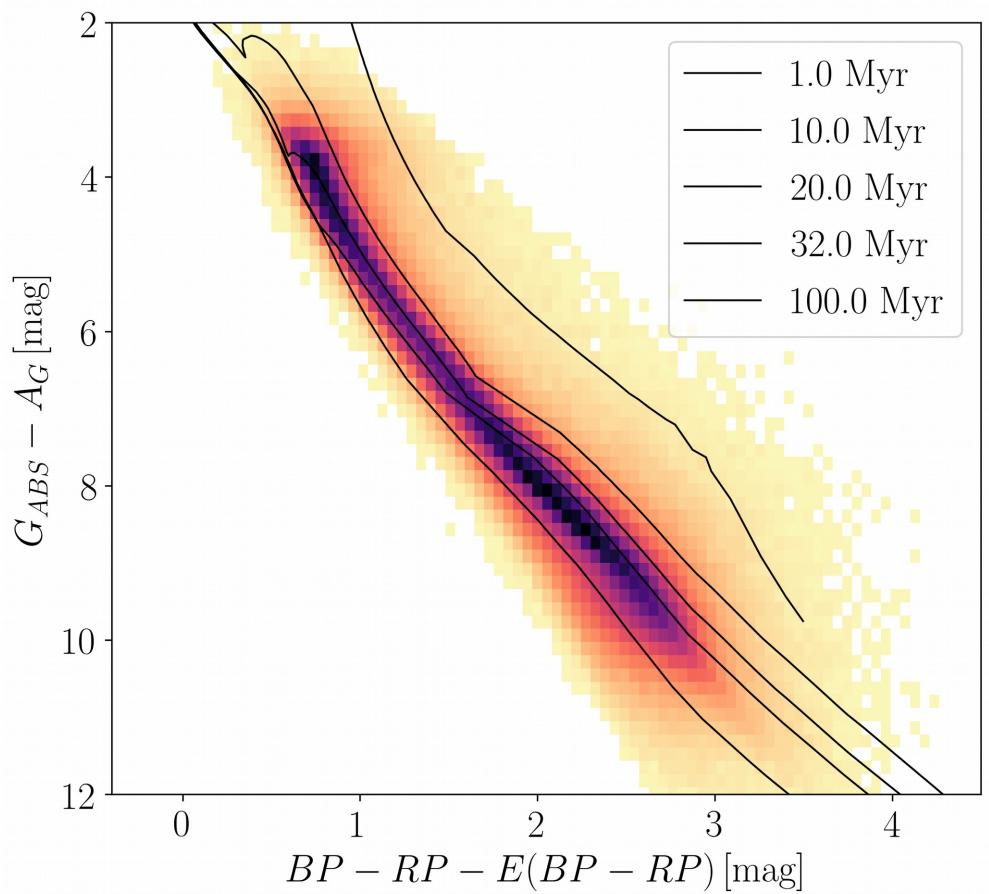
Extinction correction



Observed CMD



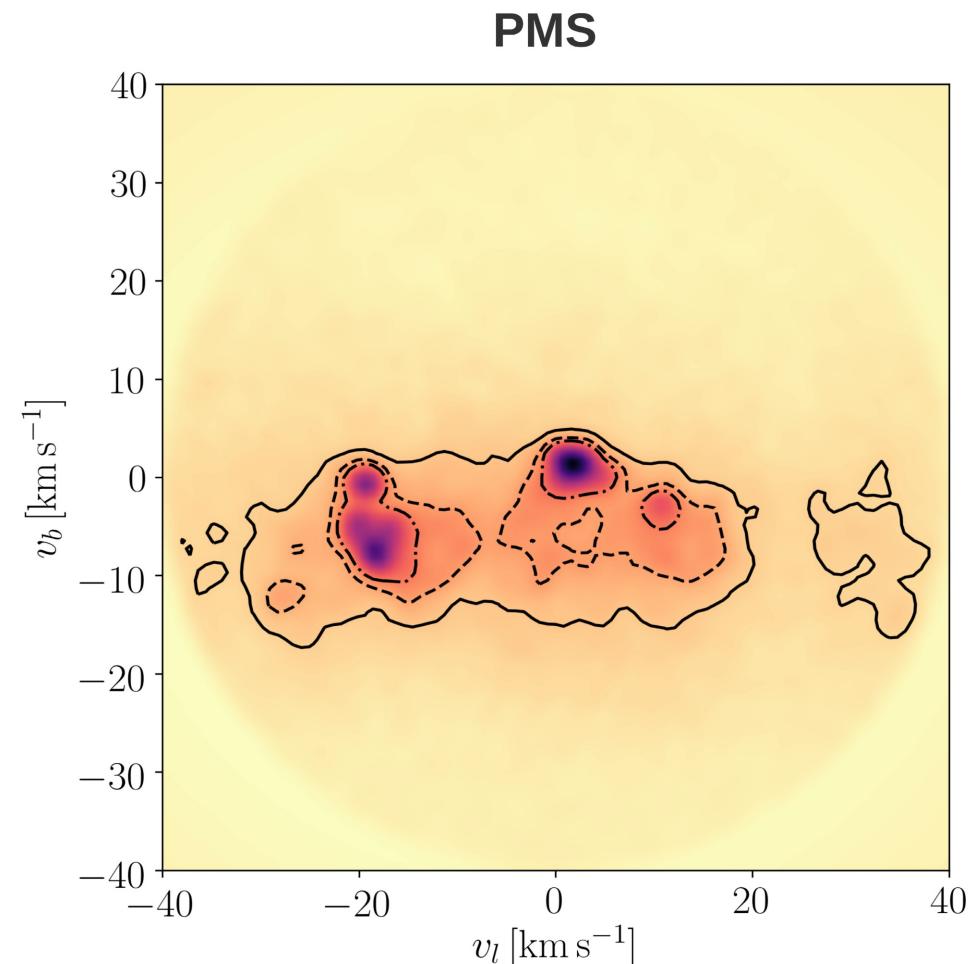
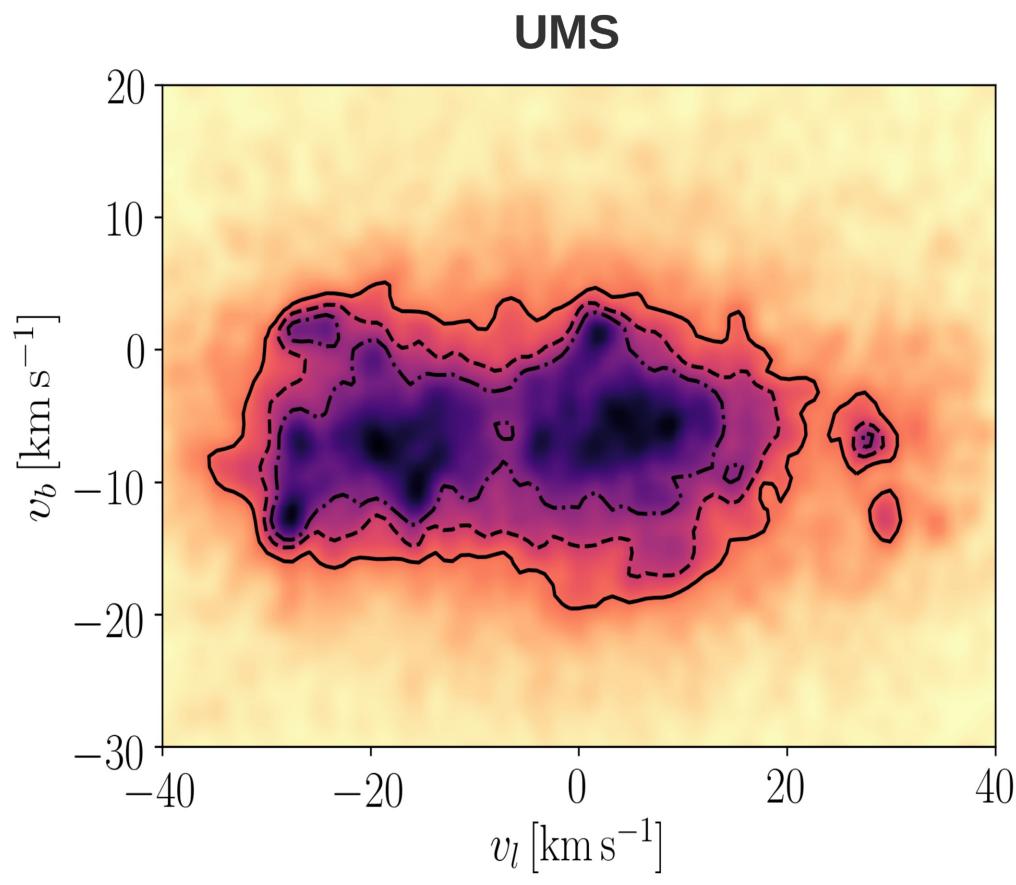
Corrected CMD



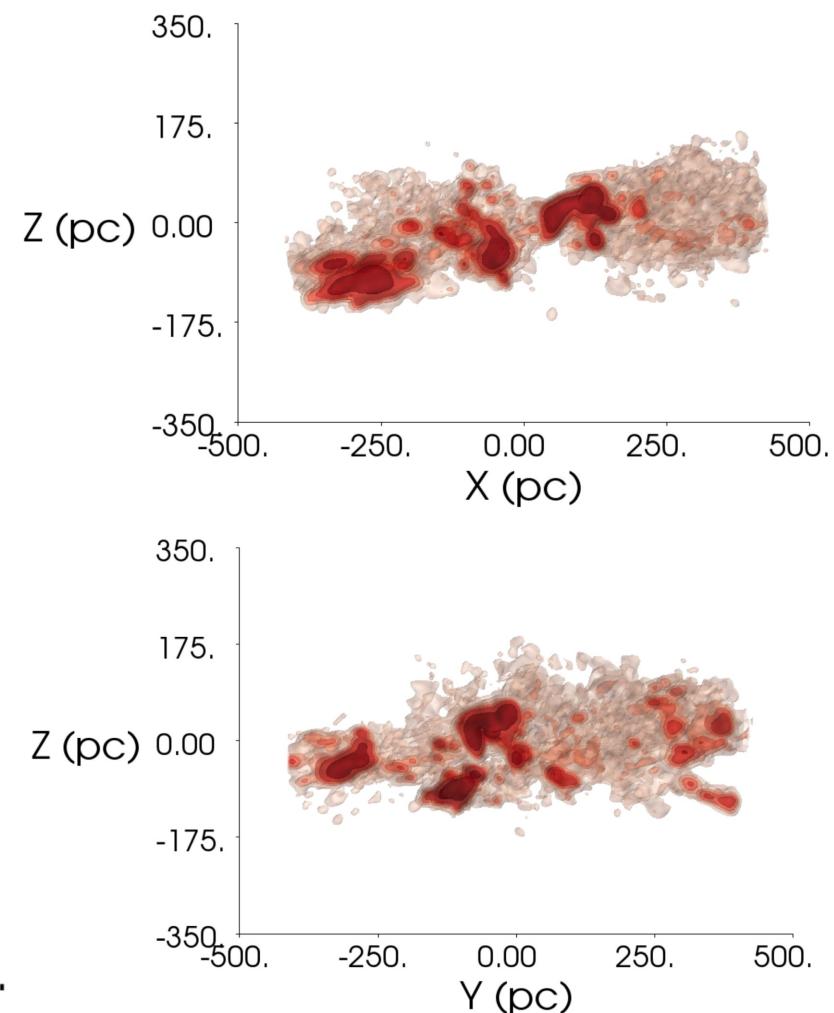
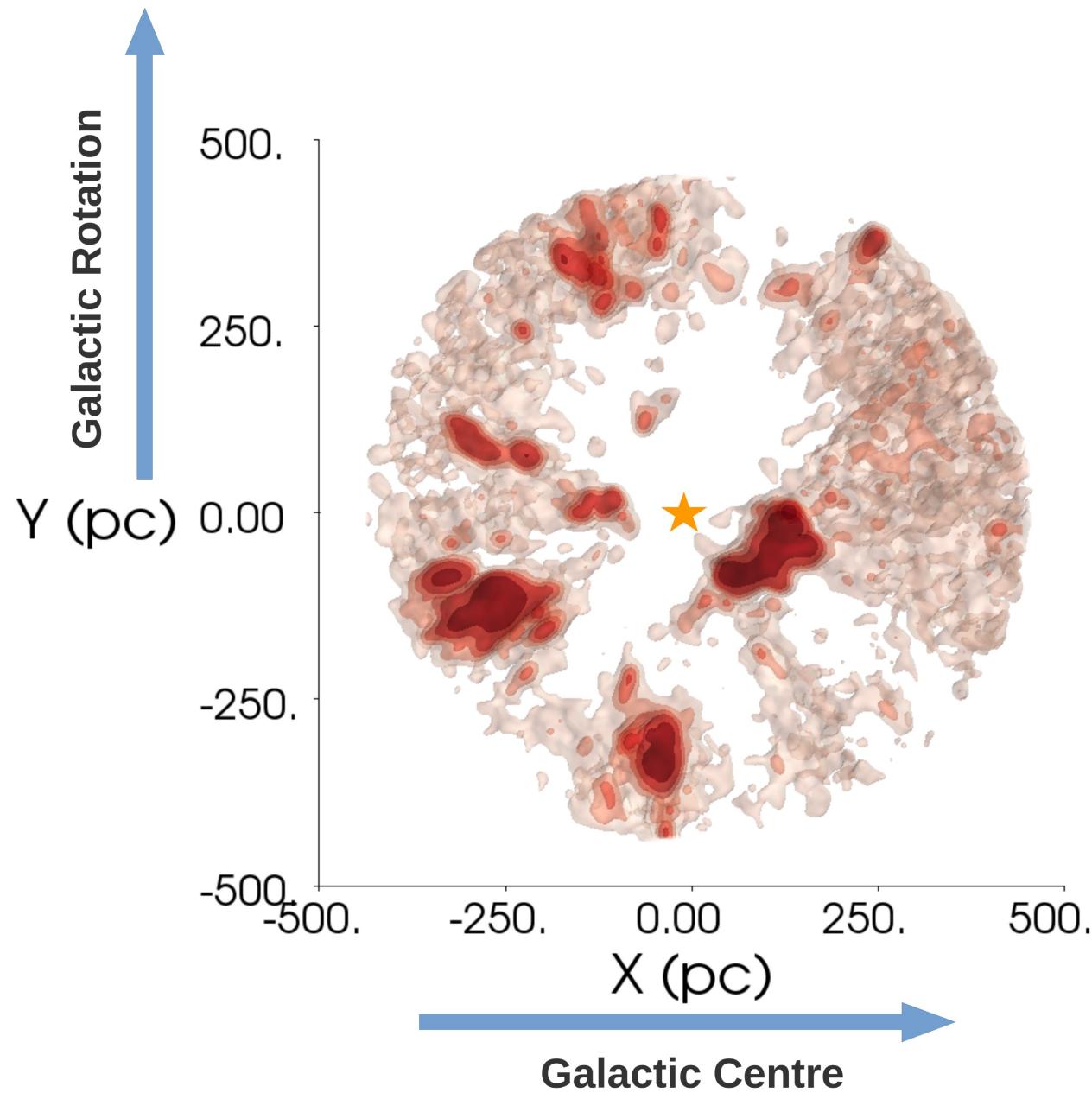
We select stars younger than 20 Myr

Tangential velocities

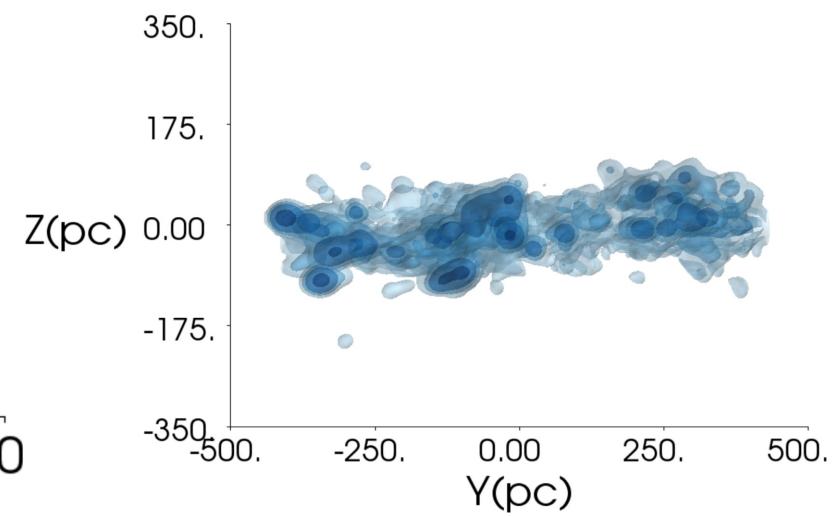
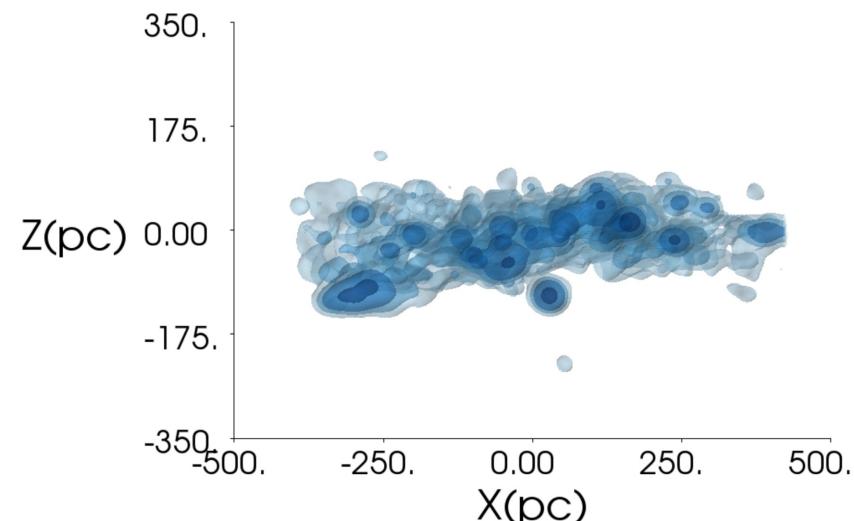
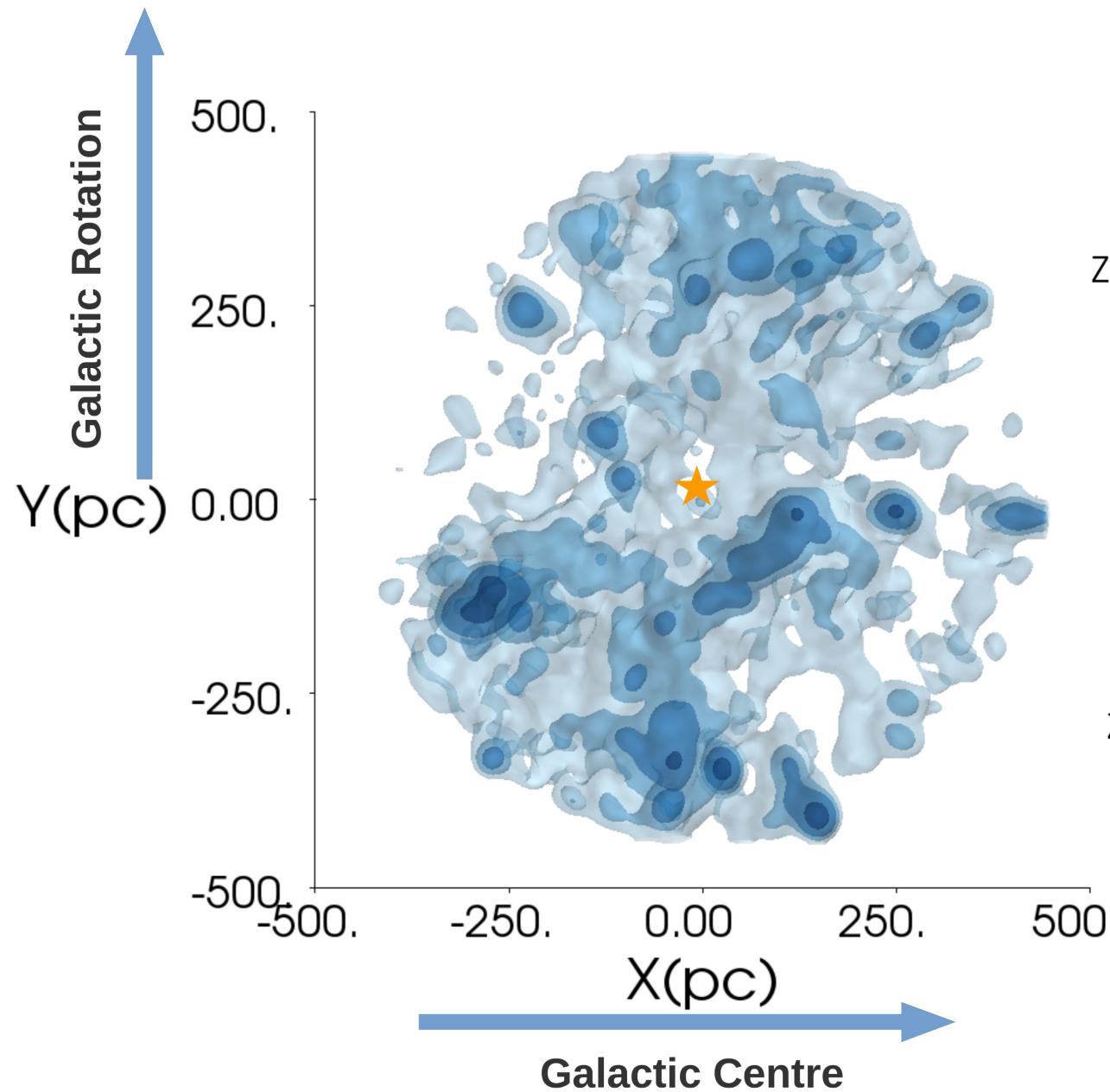
Members of clusters and associations share the same spatial velocity + small velocity dispersion.



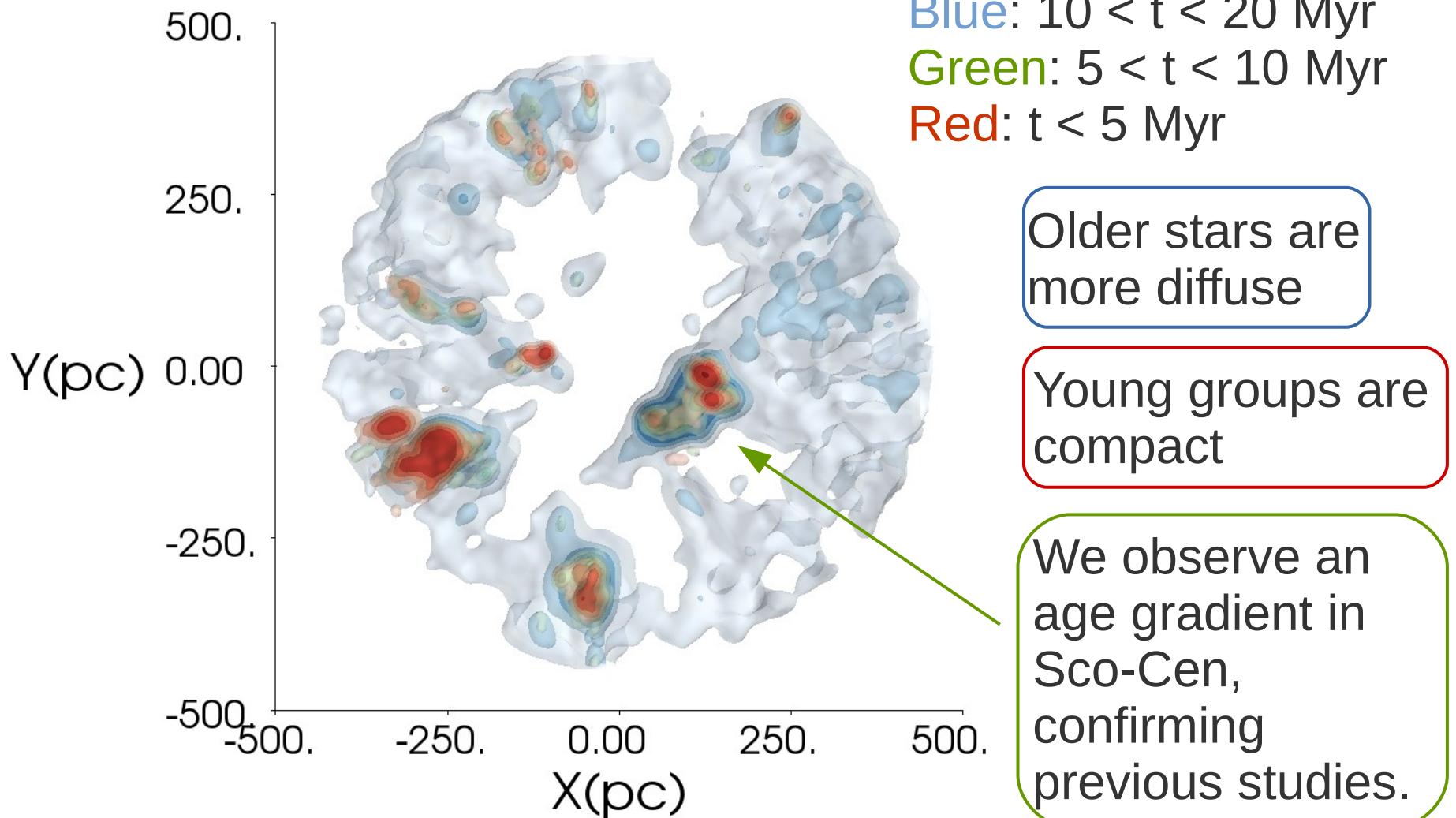
3D mapping of PMS stars



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.

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Is there a Gould Belt?

We find no evidence of a Belt-like structure!



Thank you!

gaia