

Stellar content of the Orion OB association

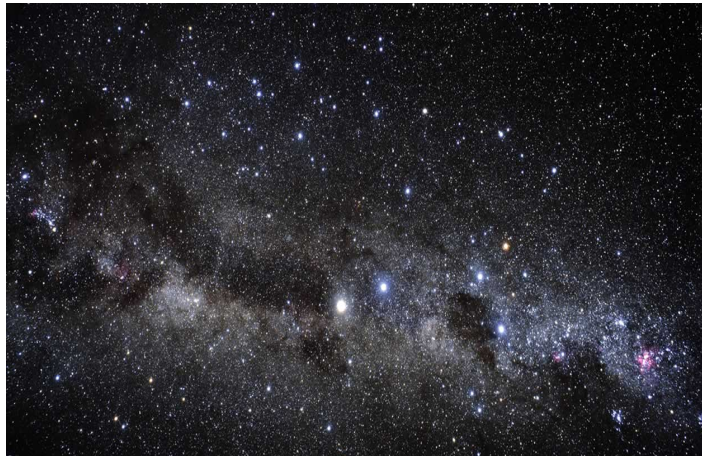
Eleonora Zari¹

Anthony Brown¹, Carlo Manara², Jos de Bruijne²

¹Leiden Observatory, ²ESA, ESTEC

OB associations

- Loose groups of OB stars, not gravitationally bound (Blaauw, 1964);
- Located near star-forming regions
→ prime sites for:
 - 1) large scale studies of star formation processes;
 - 2) interaction between early-type stars with the interstellar medium.



Sco-Cen: Difeng Guo, Poster D6

Orion

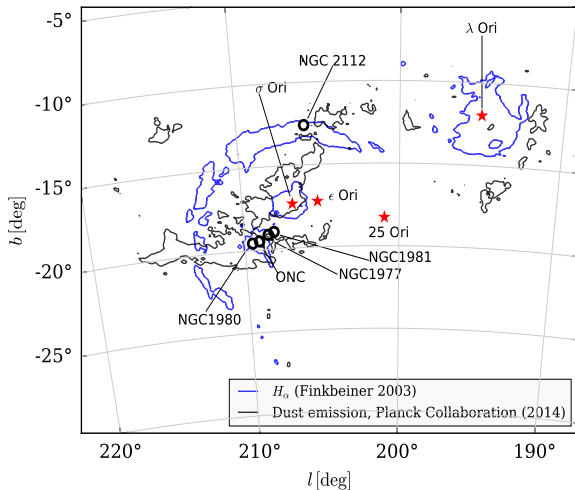
- Nearest giant molecular cloud complex;
- Site of active star formation;
- Different stages of star formation: from deeply embedded protoclusters, to fully exposed OB associations;
(Brown+94; Bally08; Briceno08; Muench+08; Da Rio+14)
- Effects of young, massive stars on the surrounding ISM.
(Ochsendorf+15; Schlafly+15)



Credits: Rogelio Bernal Andreo, DeepSkyColors.com

Orion

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Goals

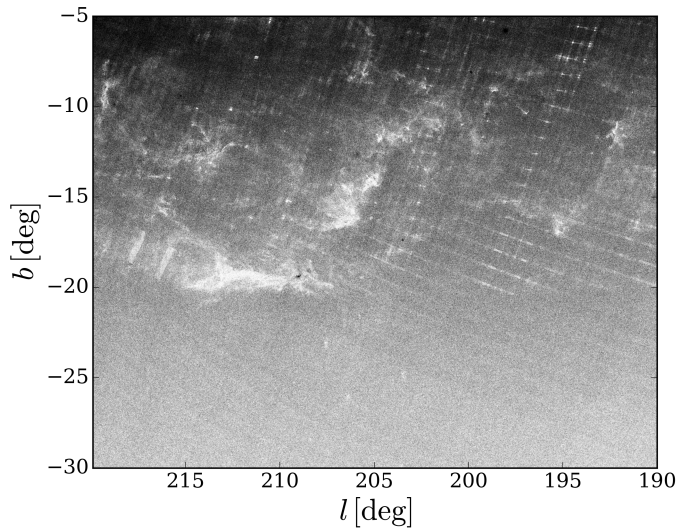
What is the stellar content and the structure of the Orion OB association?

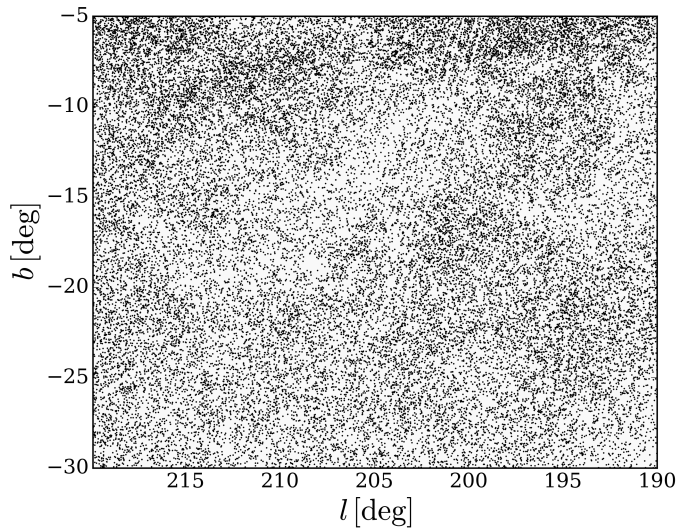
What are the characteristics of the stellar populations?

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What are the characteristics of the stellar populations?

- Initial Mass Function?
- Binaries?
- Star formation history?
- Difference between open clusters and OB associations?
- Properties of the ensemble of OB associations?
- Structure and evolution of the Galaxy?

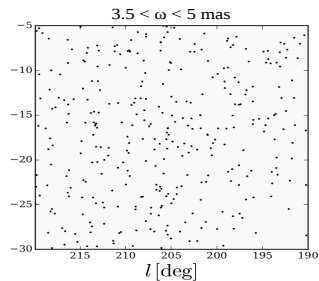
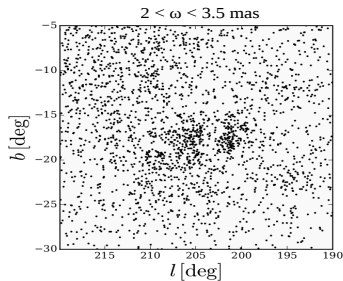
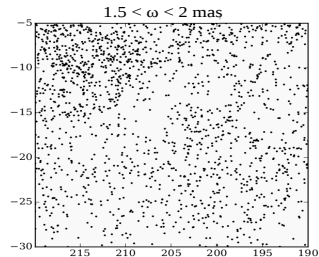
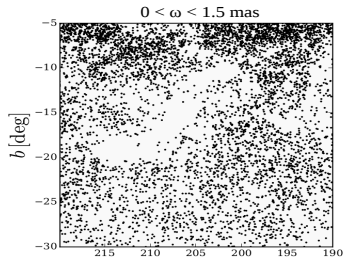




Parallax of the sources with $\mu < 5 \text{ mas/yr}$

The motion of Orion OB1 is mostly directed **radially away from the Sun**

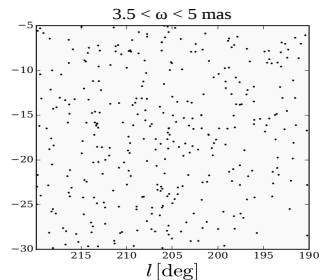
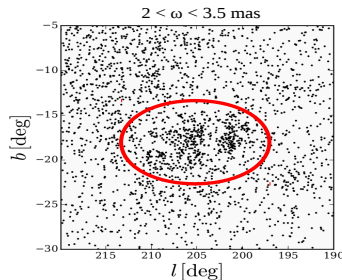
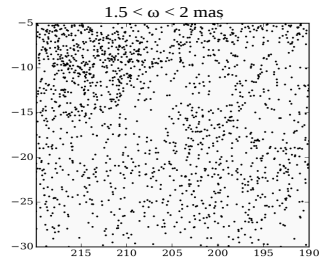
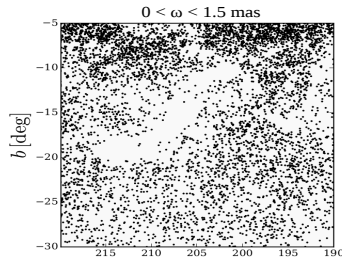
\Rightarrow the observed proper motions are small.



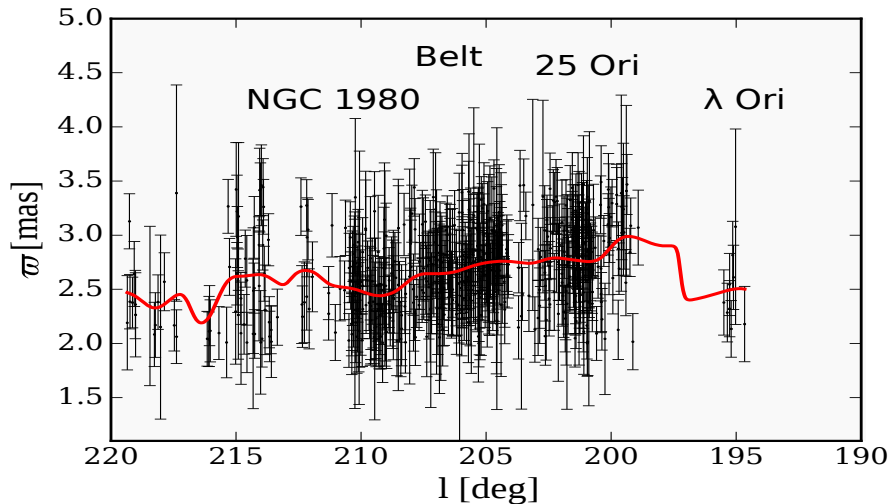
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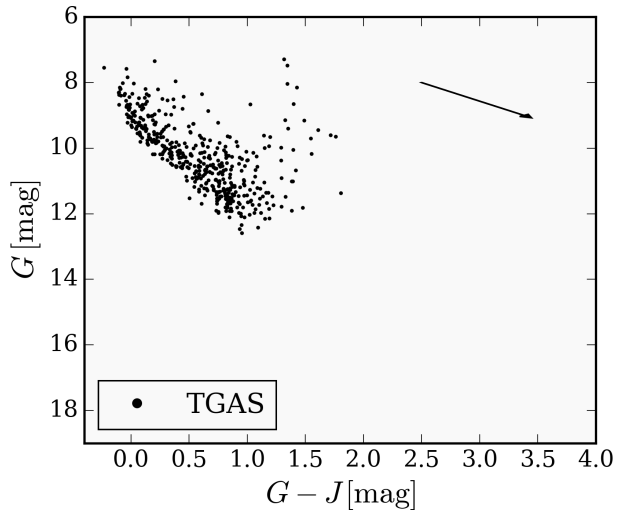
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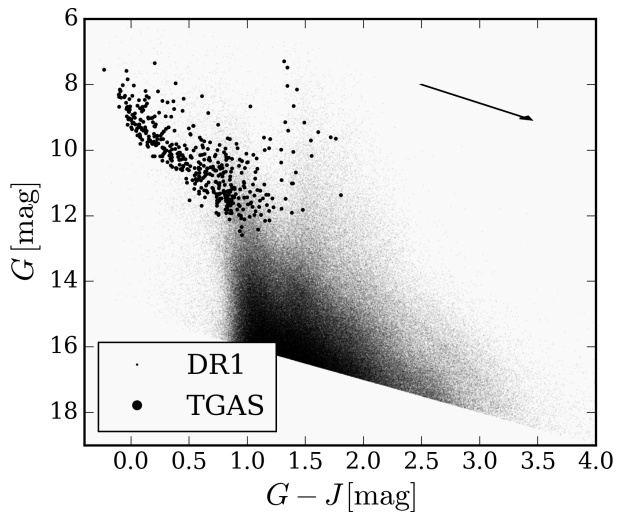
Sources with $2 < \varpi < 3.5$ mas



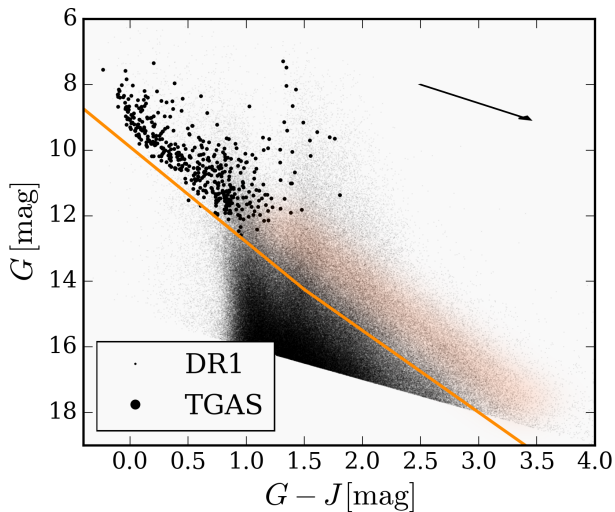
Color Magnitude diagrams



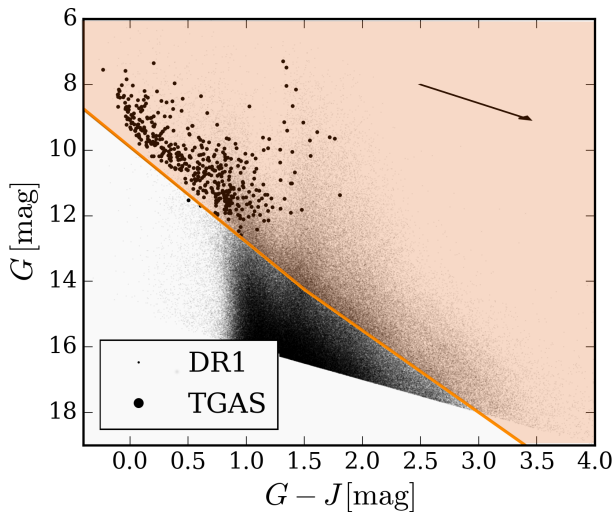
Color Magnitude diagrams



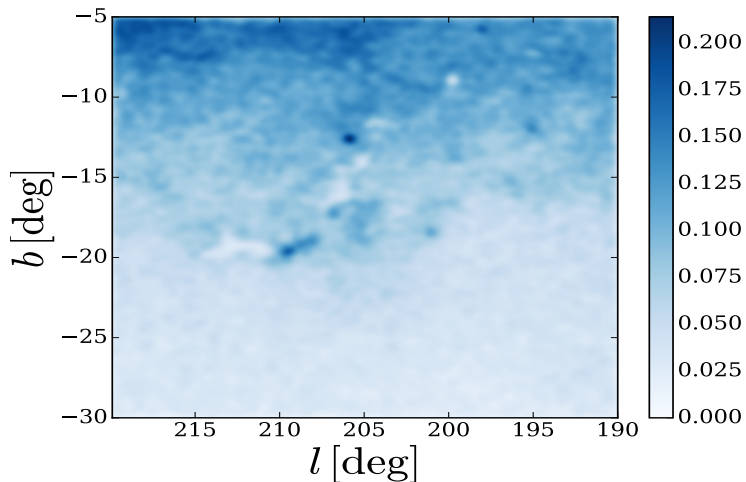
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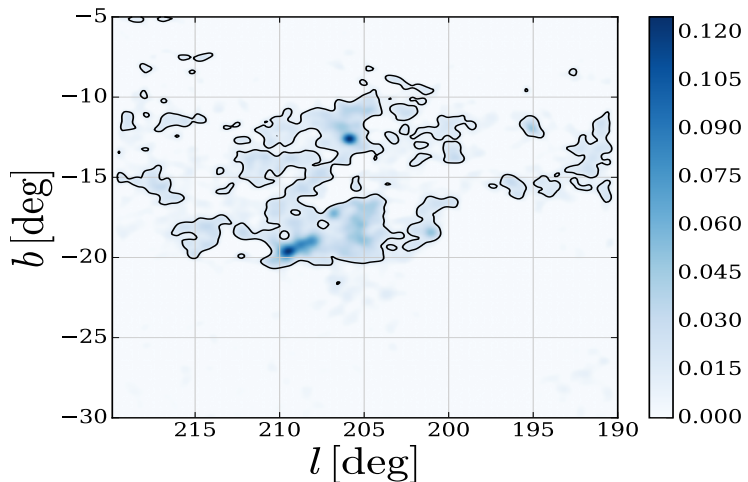
Color Magnitude diagrams



Kernel Density Estimation



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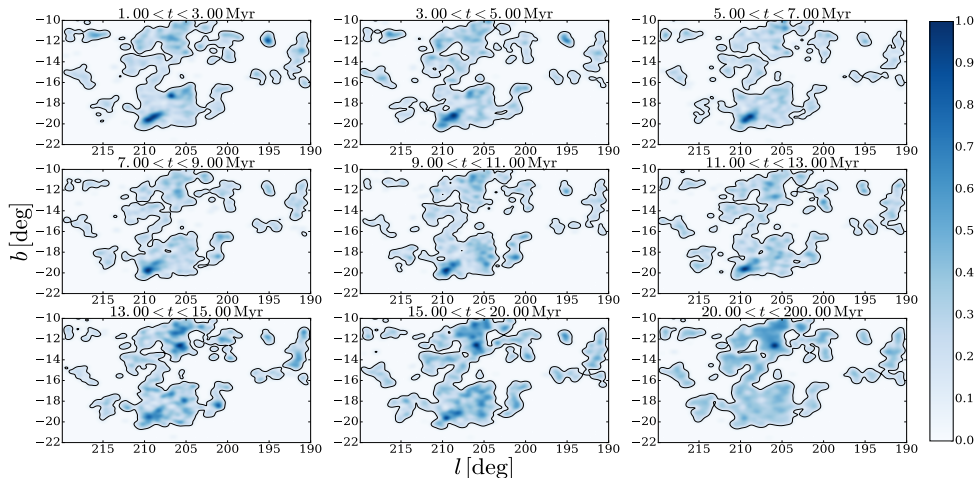


Age Maps with $\varpi = 2.65$ mas

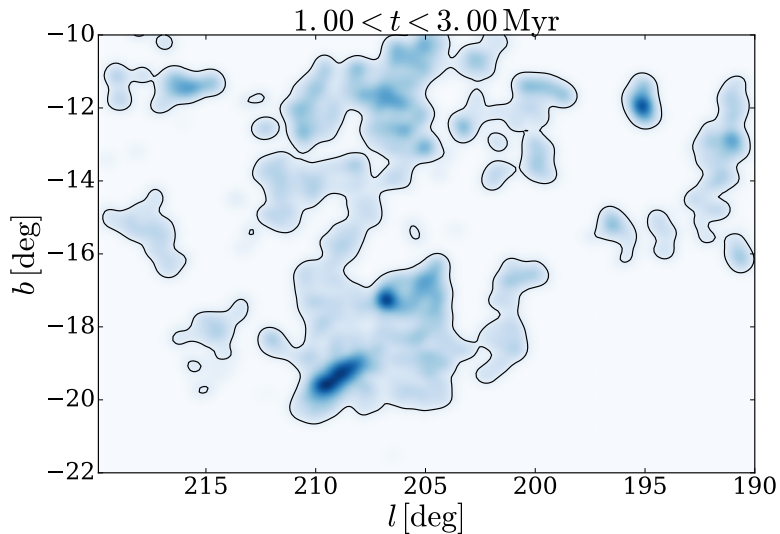
⇒ Bayesian Isochrone Fit (Jorgensen & Lindegren (2005)): Padova Isochrones with $Z = 0.02$.

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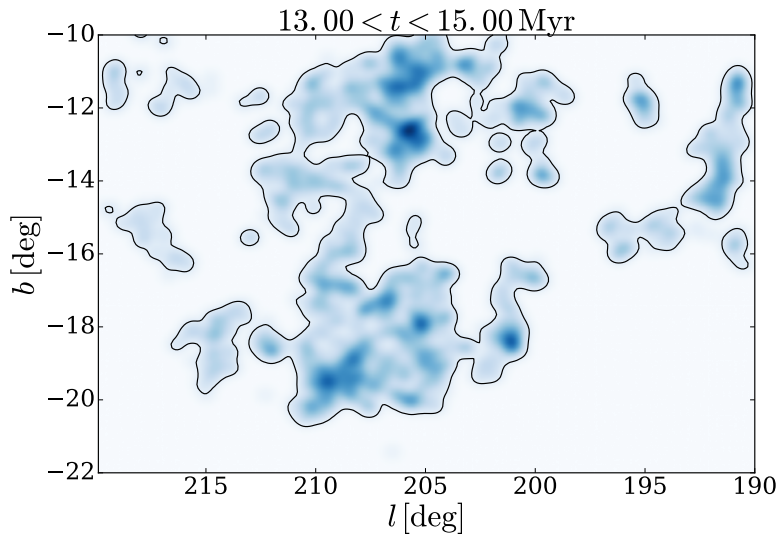
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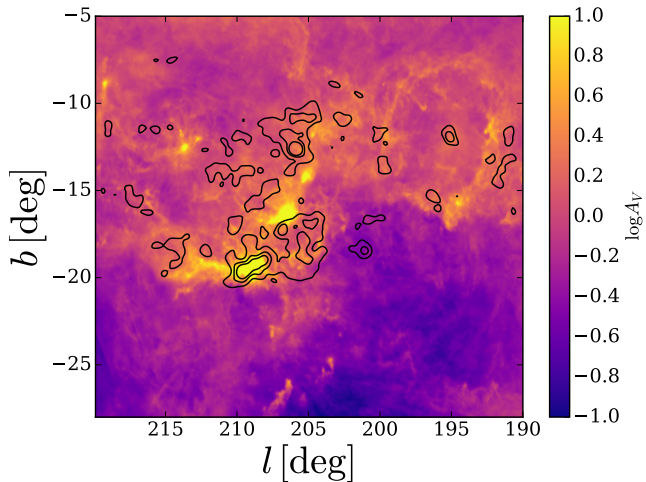
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Relation with the ISM



Extinction Map: Planck Collaboration (2014)

Conclusions

We studied the stellar population towards Orion, finding:

- Parallax gradient from 25 Ori to the ONC;
- Age gradient corresponding to the parallax gradient.

Fresh view of the star formation history of the Orion region.

With *Gaia* DR2 we will be able to address:

- Kinematic properties of the Orion OB association;
- Relation between the OB association and the gas structures in Orion.



Thank you!



gaia

Previous age estimates

Orion OB 1a & λ Ori:	~10-12 Myr
Orion OB 1b:	~ 8 Myr
Orion OB 1c:	~ 3-6 Myr
Orion OB 1d: (ONC/ NGC2068/71/Orion A/B clouds)	~ 2 Myr

