3D study of the Gould Belt

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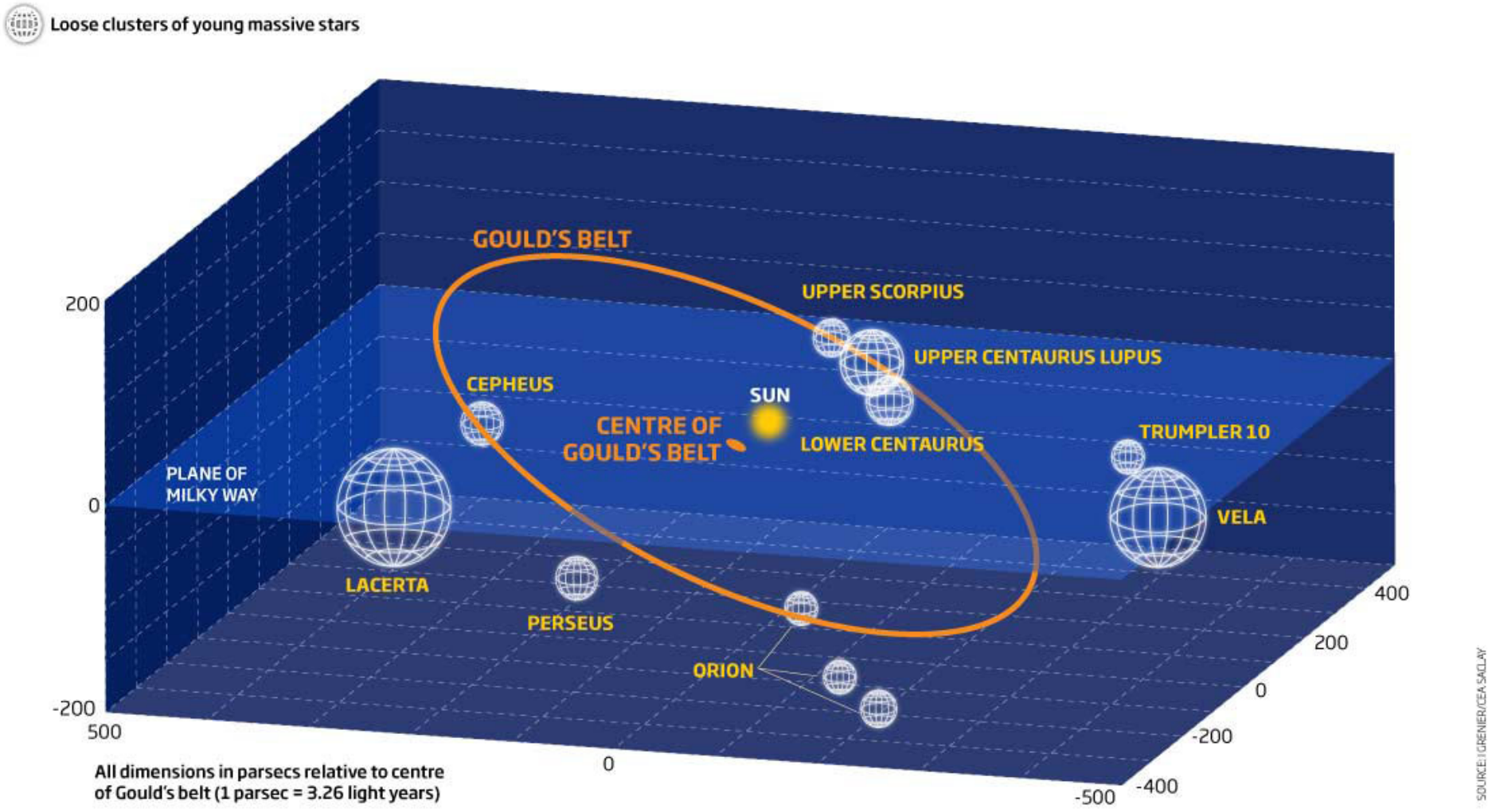
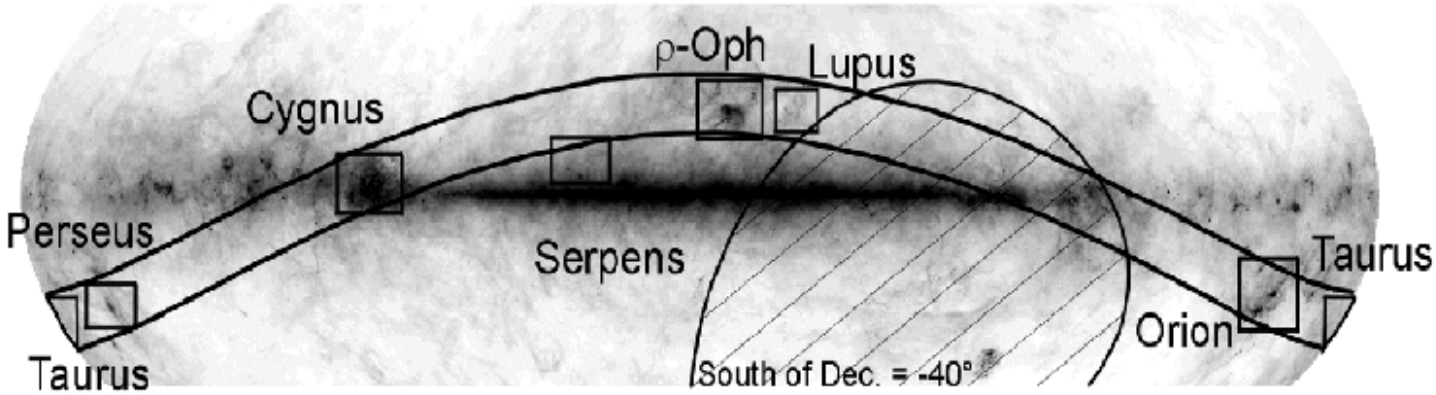
The Gould belt



Ring of stars including a large number of young clusters and star forming regions

The Gould belt



Ages & Distances of some regions in the GB

Association	Distance (pc)	Age (Myr)
Rho Oph	130-160	< 1
Taurus	140	1-3
Lupus	140-200	1-5
Serpens	260	2
Orion	450	1-5
UCL	140	15

Young late-type stars in the Gould Belt

Gould Belt: suitable place to study star formation

- fundamental parameters of young stars
- PMS evolution
- environment dependence

- Distances: Hipparcos measurements. Large uncertainties for d > 100pc.

  Studies consider a single distance for all the members. No info about the depth of the SFRs.

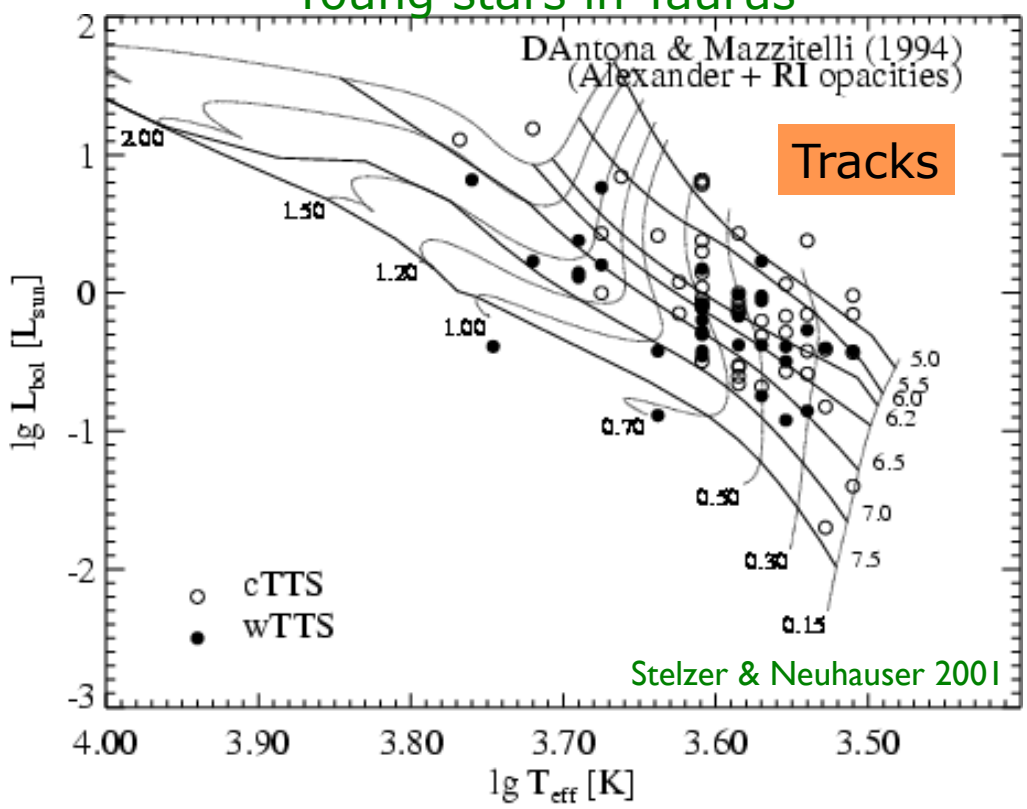
- The 'primary' determination of ages relies on comparisons of stellar models or isochrones with the best-available data, in particular luminosity, effective temperature and abundances, on individual stars or stellar groups

Young late-type stars in the Gould Belt

-Distance

Young objects:
- disks
- Variability
- Extinction law

Young stars in Taurus



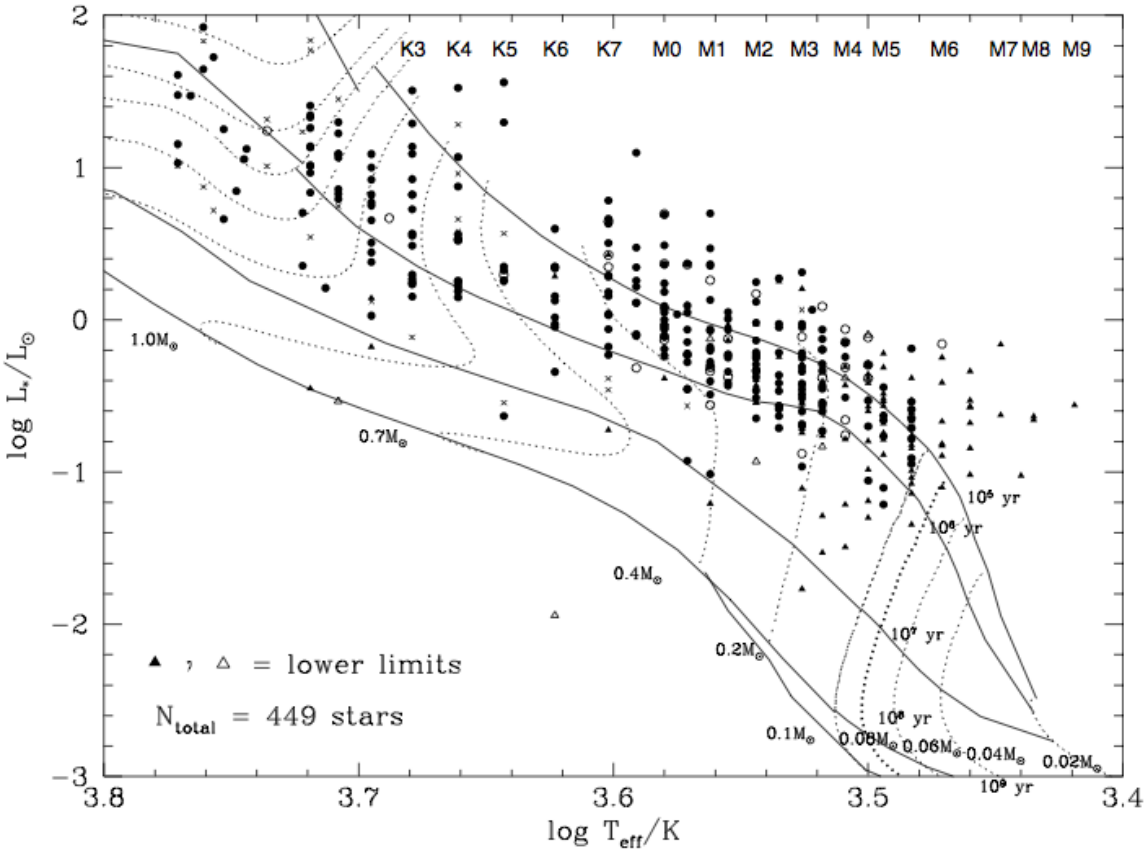
~100-300 K

Uncertainties in both axes → uncertain stellar parameters

(Hillenbrand 2009)

Young stars in the Gould Belt

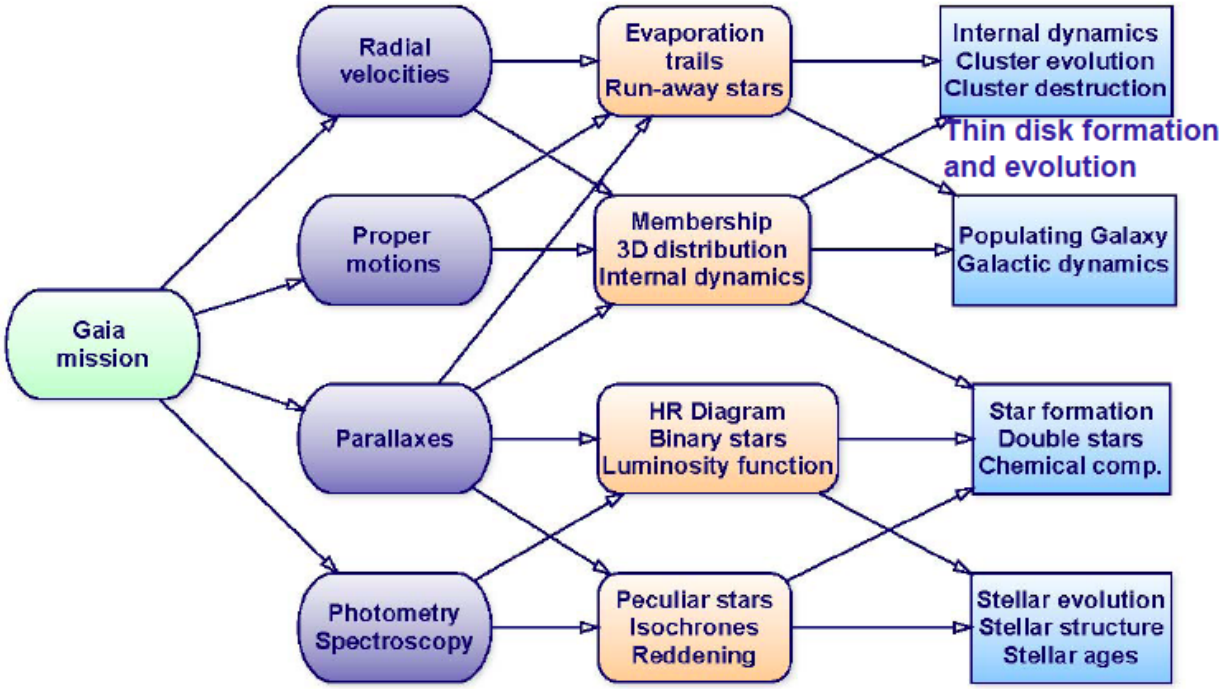
Young stars in Orion



Age Spread
in
HR diagrams

- Are the apparent luminosity spreads real?
- Do they indicate true age spreads?
- Can we use them to infer star formation histories?

Gould Belt & GAIA: objectives

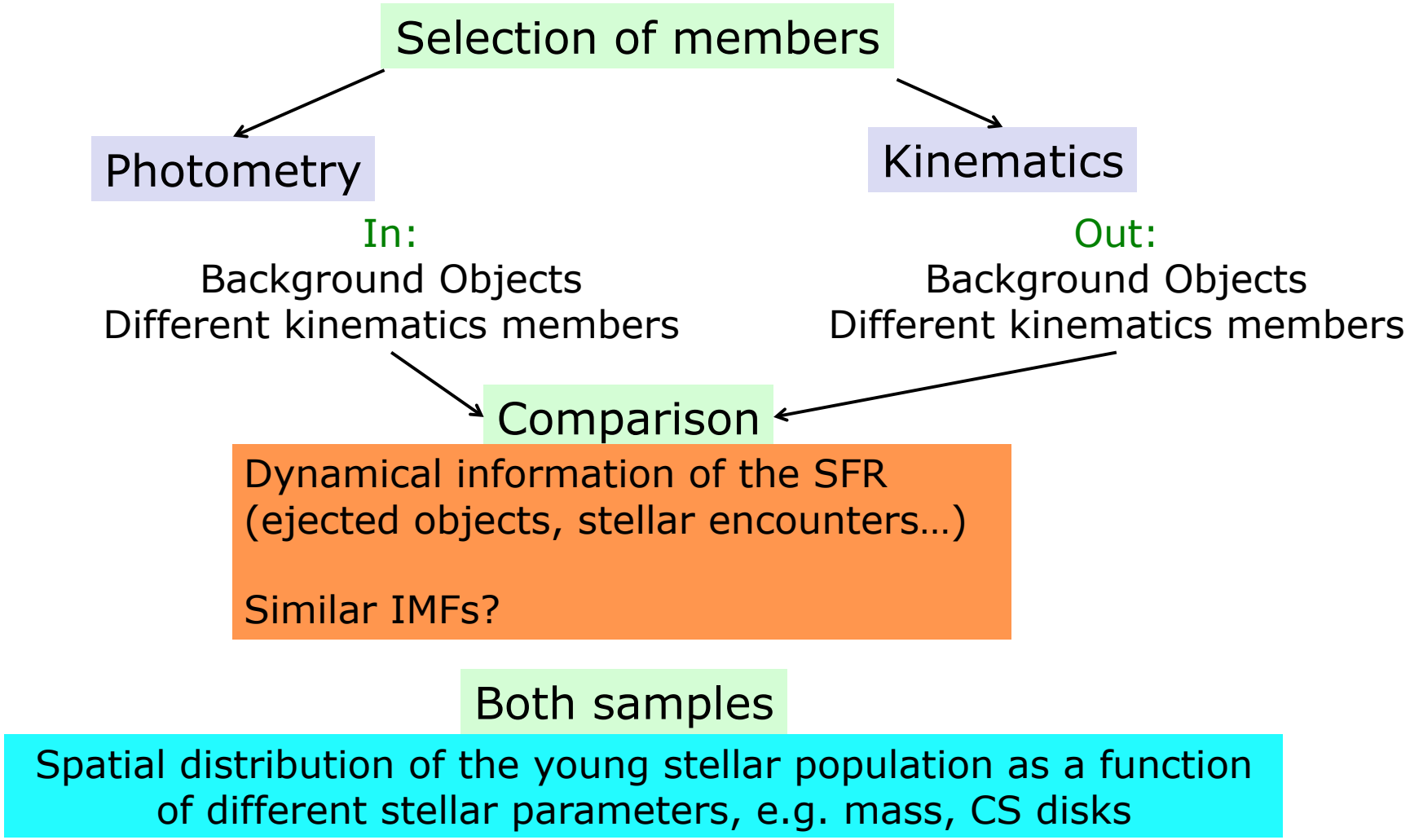


(F. van Leeuwen)

For each selected region:

1. Build HR diagrams with small uncertainties: precise stellar parameters
2. Spatial (3D) distribution of stellar population and kinematics
3. Velocity and age spreads

Gould Belt:
Ground-based data+Gaia



Working plan

Short term

- Selection of suitable regions in the Gould Belt (A_v, different environments)

- For each region:

  Selection of candidate members: photometry

  Public Catalogues and Archived Observations

S. Mejido & C. Eiroa, (UAM)

N. Huélamo (CAB)

A. Mora (GAIA, ESAC)

Working plan

Mean and long term

Spectroscopic characterization of candidate members:

- Youth indicators: Lithium
- T_{eff}, metallicity
- Accretion: H alpha
- Radial velocities with precision better than 1 km/s

(velocity dispersions in SFR can be ~1-2 km/s)

Working group

- D. Barrado, H. Bouy, E. Solano, B. Montesinos, A. Moya (CAB)
- C. Eiroa, S. Mejido (UAM)
- A. Mora (GAIA, ESAC), B. Merín (Herschel, ESAC)
- C. Melo (ESO)

GREAT: Open Clusters and Young Associations
- Sofia Randich & David Barrado (star formation)