GROUND-BASED SPECTROSCOPIC SURVEY(S)

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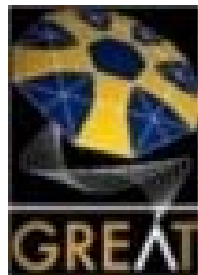
Discussion on ground-based spectroscopy to supplement and best exploit Gaia data started at the first WGB1 meeting held in Padova in Oct. 2009, based on the news that ESO STC had recommended ESO to issue a call for public very large spectroscopic surveys



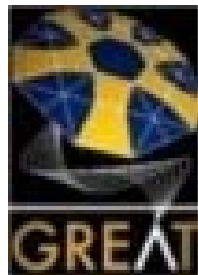
BUT, IN ORDER TO BEST ADDRESS ALL THOSE SCIENCE GOALS AND EXPLOIT GAIA

❖ V_{rad} with accuracy better than at least

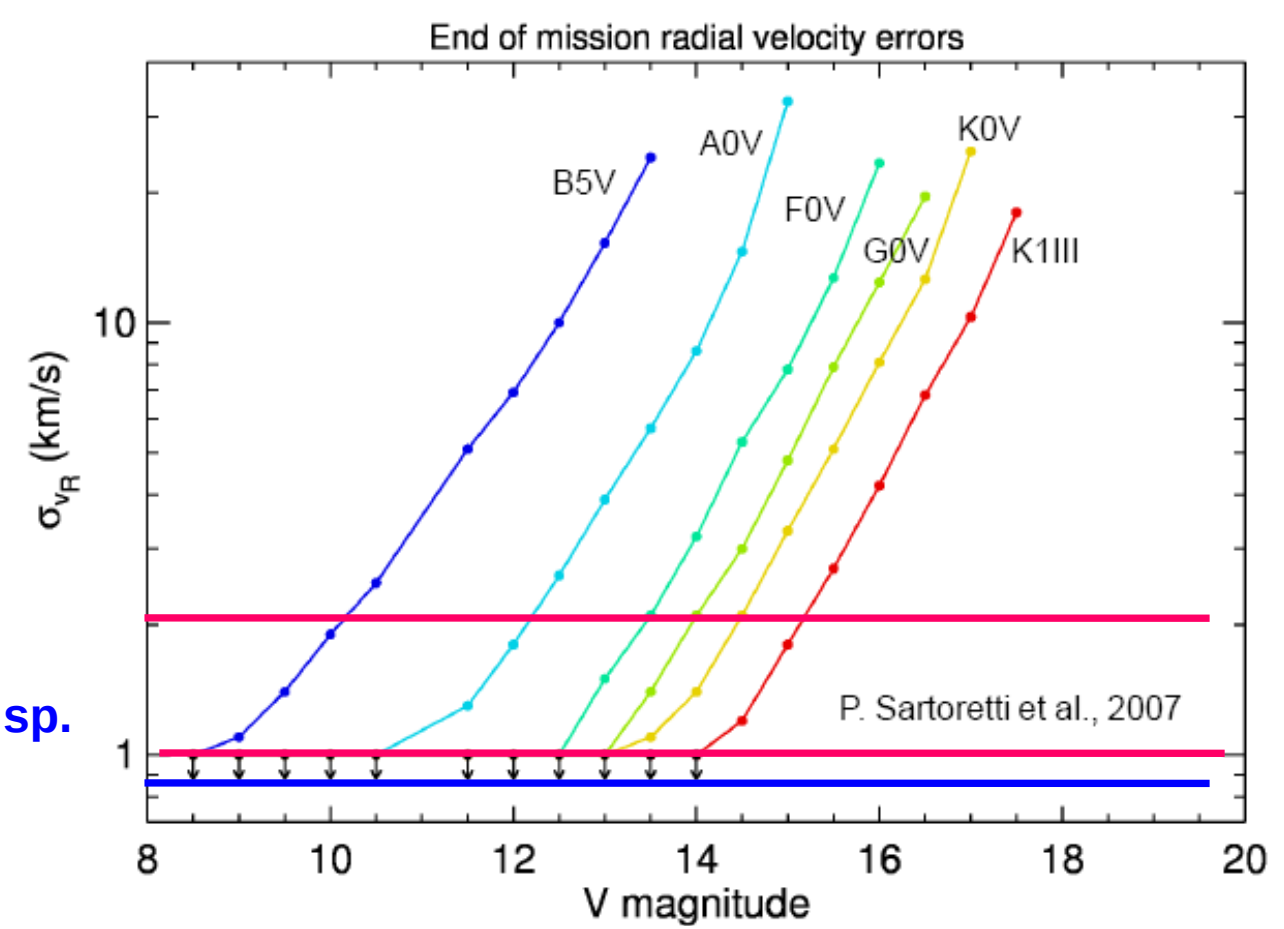
1 km/sec is critical (internal dispersion 1-2 km/s, proper motion accuracy from Gaia as good as 0.3 km7sec)

- Accurate stellar parameters also fundamental
- Accurate [Fe/H] and abundances
- Age and accretion/activity tracers → lines outside the RVS (847.874 nm) spectral range (Li, Hα, Ca II H&K)

→ medium-high resolution from the ground ←



Typical internal disp.



PREPARING FOR THE ESO CALL (IDENTIFICATION OF 4 MAIN THEMES)

Star Formation: D. Barrado y Navascués, G. Micela, S. Randich

Stellar structure and evolution including evolution of angular momentum:
A. Lanzafame, F. van Leeuwen, A. Vallenari

Internal dynamics: F. van Leeuwen, A. Spagna

Thin disk formation and evolution: A. Bragaglia, E. Pancino

- ✓ **First draft: science cases, requirements**
- ✓ **Preliminary target selection and survey plan**

GREAT CHEMO-DYNAMICAL SURVEY (GCDS)

(http://camd08.ast.cam.ac.uk/Greatwiki/GreatCds)

Started by WGA3 (chemical tagging): N. Walton, S. Feltzing

- Potentially a long lasting and large multi-institute/ multi-national collaboration
- A vehicle to deliver ambitious surveys exploiting Gaia

GREAT CDS GOALS

- 4-m spectrograph build:
  - 3+1 yr – 2014 on WHT (or CFHT) and/or VISTA
  - 5 yr survey – 1000 nights in N/ 1000 nights in S
  - Complete survey by 2019 – matched to release of Gaia
- 2000 night 4-m survey defines scope for disk/halo/bulge components
- Initiate 4-m programme now as pilot with current facilities
  - La Palma – autumn ITP programme (all spectroscopy)
  - GCDS consortium effort

- 8-m component – via ESO large programme
- 500 nights over three years (1500 over 9 years)

GREAT CDS STRUCTURE

Four science experiments

SE1: Mass Distribution of the Galaxy

SE2: Galaxies formation and evolution traced by chemistry

SE3: Clusters and star formation and evolution

SE4: Additional and legacy Science

+ transversal functional WGs – these might include

FWG1; Survey Planning
FWG2: *Data* Management
FWG3: Instrumentation Development

+ WG for the ESO FLAMES Public Survey

GREAT CDS ORGANIZATION

- Institute Council
  - Provides the top level authority for GCDS
  - Composition: one member from each participating institute
- GCDS Executive Group
  - Provides the strategic leadership of the GCDS
  - Composition: WG co-leads + GCDS co-spokespersons
- Science Experiment/ Tech Workgroups
  - As far as possible – activity devolved to the SE/TWGs
  - Each coordinated by two co-spokespersons

SE3 ORGANIZATION

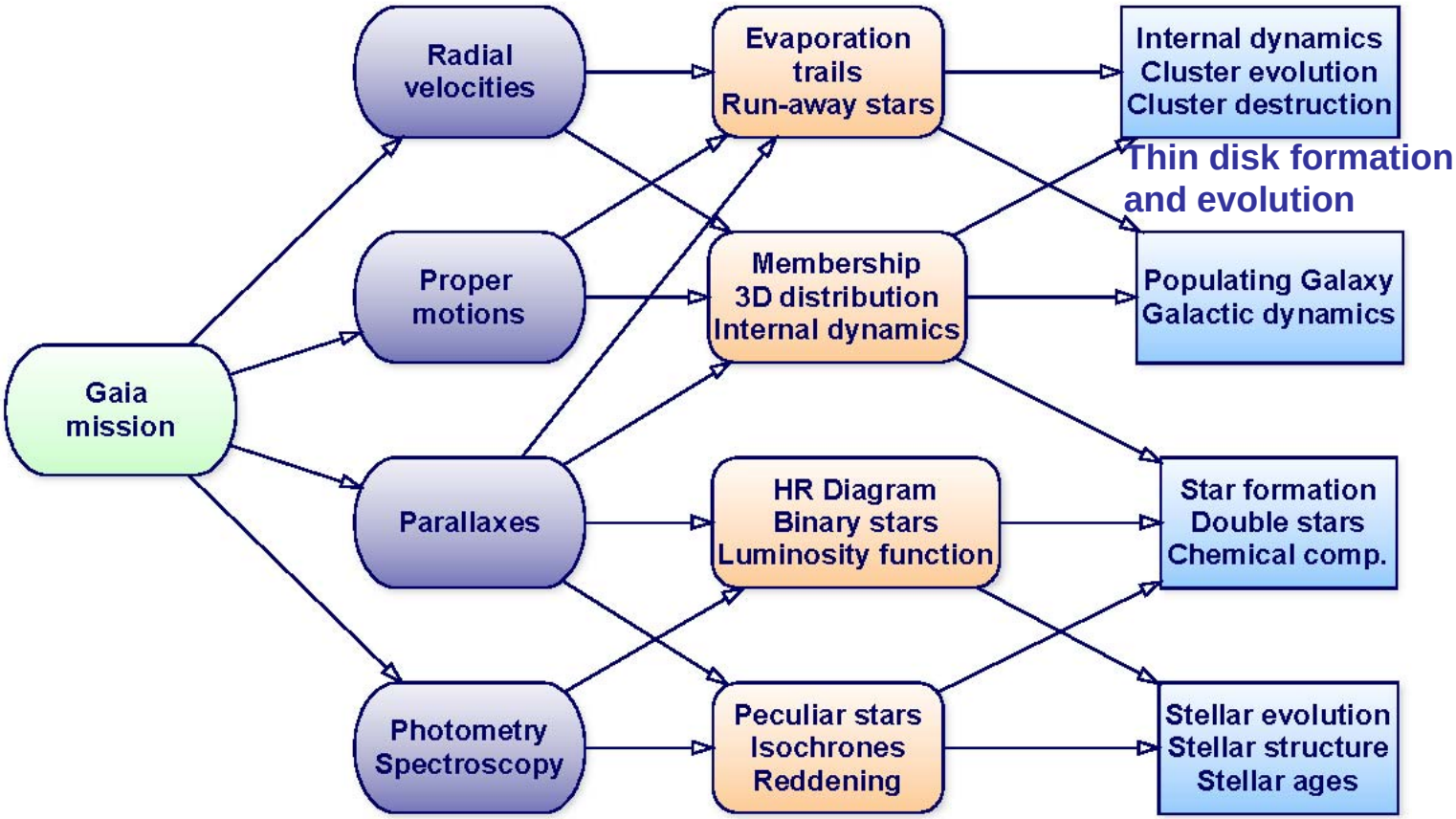
SPOKEPERSONS

S. RANDICH &F. VAN LEEUWEN

(First telecon: May 26 2010 15:00)

- Define priorities (breakthrough science)
- Interaction with CDS and other SEs – ESO Survey
- Which FWGs would we like? SE3 representation in FWGs
- Setting up a WG to work toward a survey planning (requirements in terms of λ coverage, R, S/N)
- Setting up a WG to work toward an inventory of available tools
- (RV, chemistry, etc.)
- Setting up a WG to work on sample selection and 'archive search'

Again on science



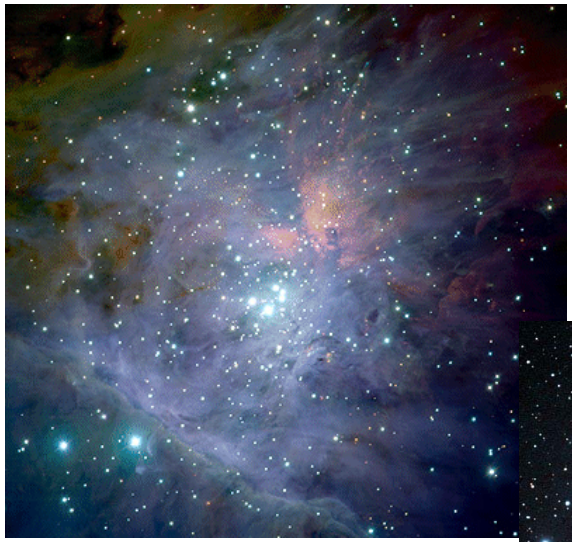
Courtesy of F. van Leeuwen

AGAIN ON SCIENCE

e.g. STAR FORMATION (similar for other themes)

ISSUE	Key parameters	GAIA contribution	Info from FLAMES	Different GB observation (e.g., phot., 4m, etc.)	Requirem. FLAMES	Sample for FLAMES
SFHs	Membership, ages	…..	……			…….
IMF						
Mass segregation						
Feedback from massive stars						
Triggered star formation						
Disk lifetimes						
Binary fraction						

Goal- all phases of cluster evolution



PMS clusters (<5-100 Myr)

Star forming regions (<1-5 Myr)

Intermediate-age and old clusters (100 Myr – 8 Gyr)

Radial velocity performance

End of mission: faint stars

	V	Vr (km/s)
➢ B1V	12	15
➢ G2V	16.5	15
➢ K1IIIMP	17	15

End of mission: bright stars

	V	Vr (km/s)
➢ B1V	7	1
➢ G2V	13	1
➢ K1IIIMP	13.5	1

Abundances for all stars brighter than G_{RVS}=12

Atmospheric paramteres for all stars brighter than G_{RVS}=14