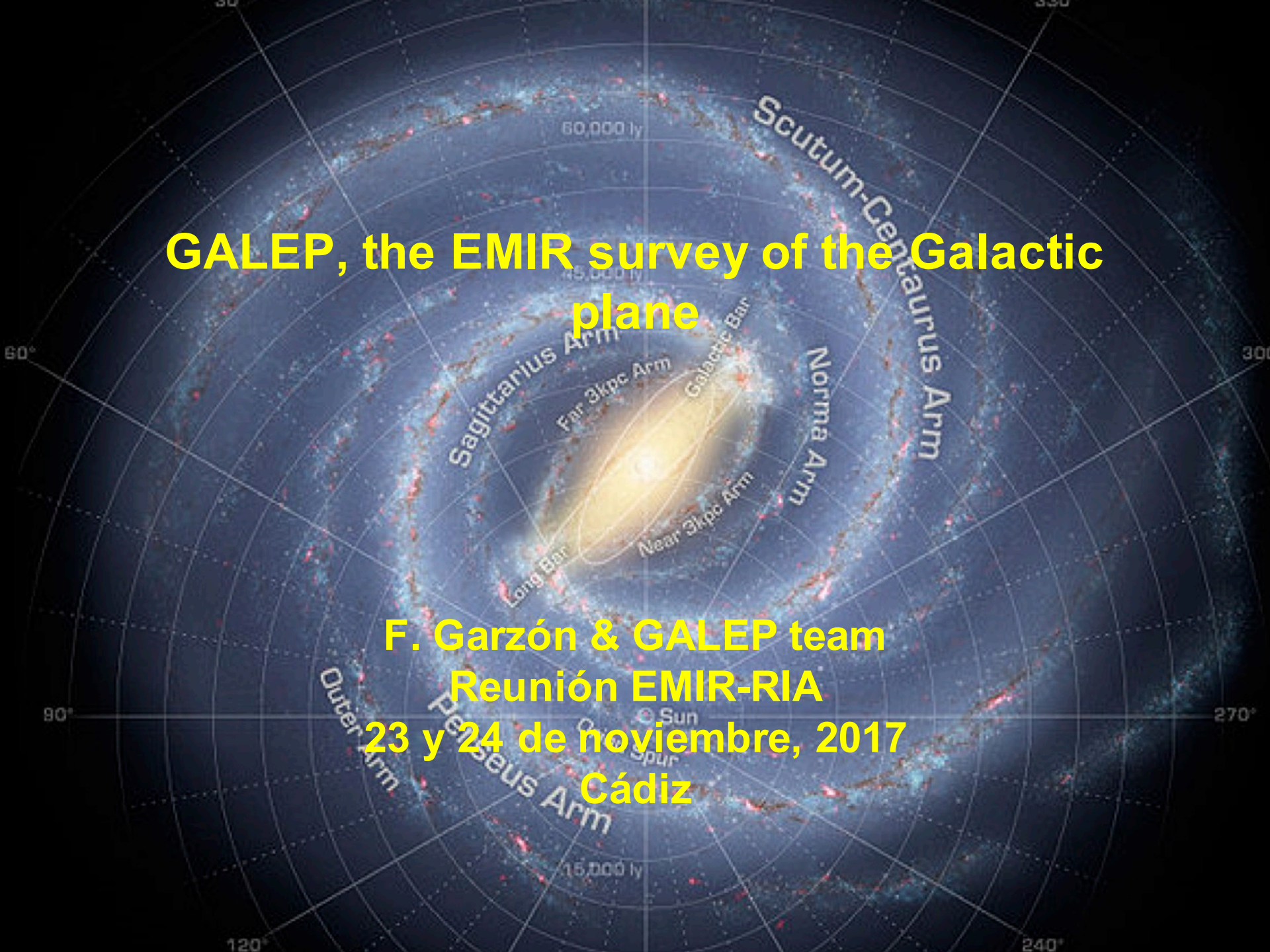


GALEP, the EMIR survey of the Galactic plane

F. Garzón & GALEP team

Reunión EMIR-RIA

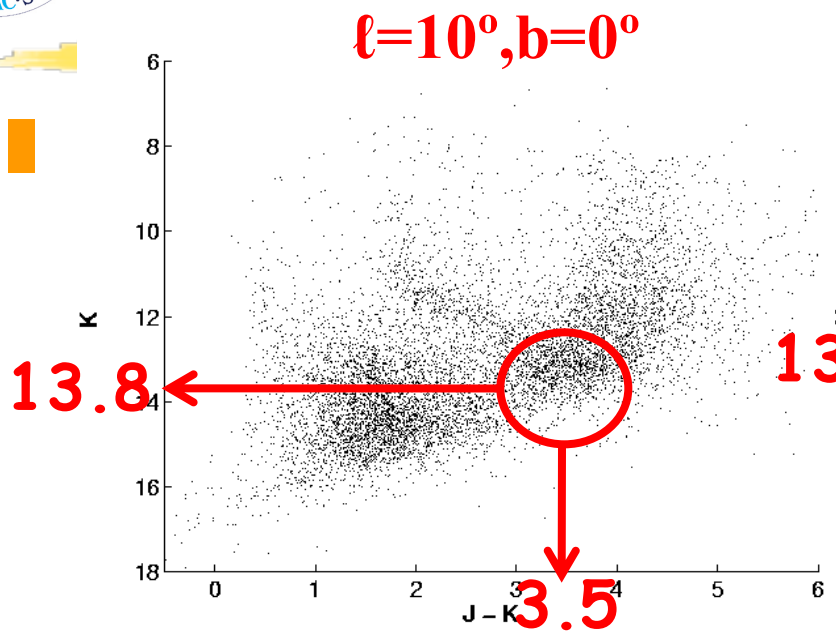
23 y 24 de noviembre, 2017

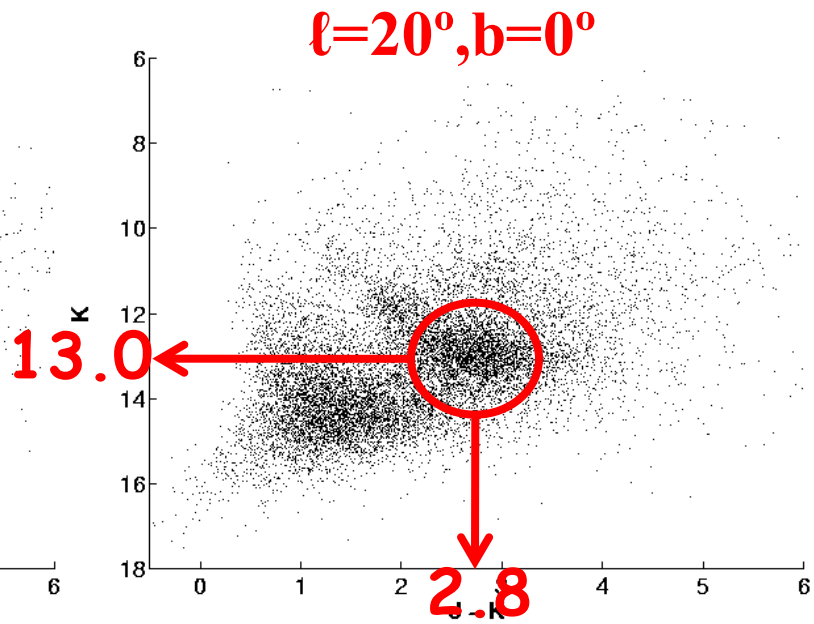
Cádiz

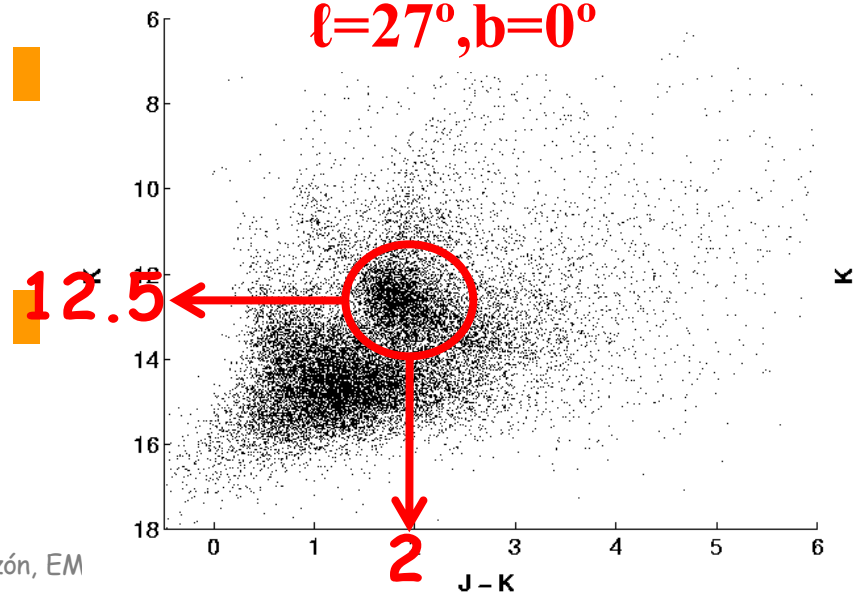
Summary

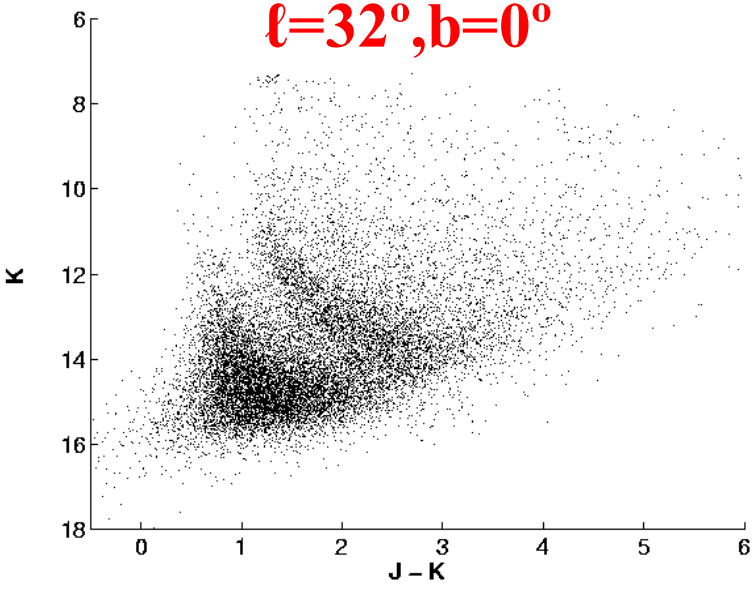
- The project: GALEP
  - motivation
  - the case
  - observational strategy

GALEP: the motivation

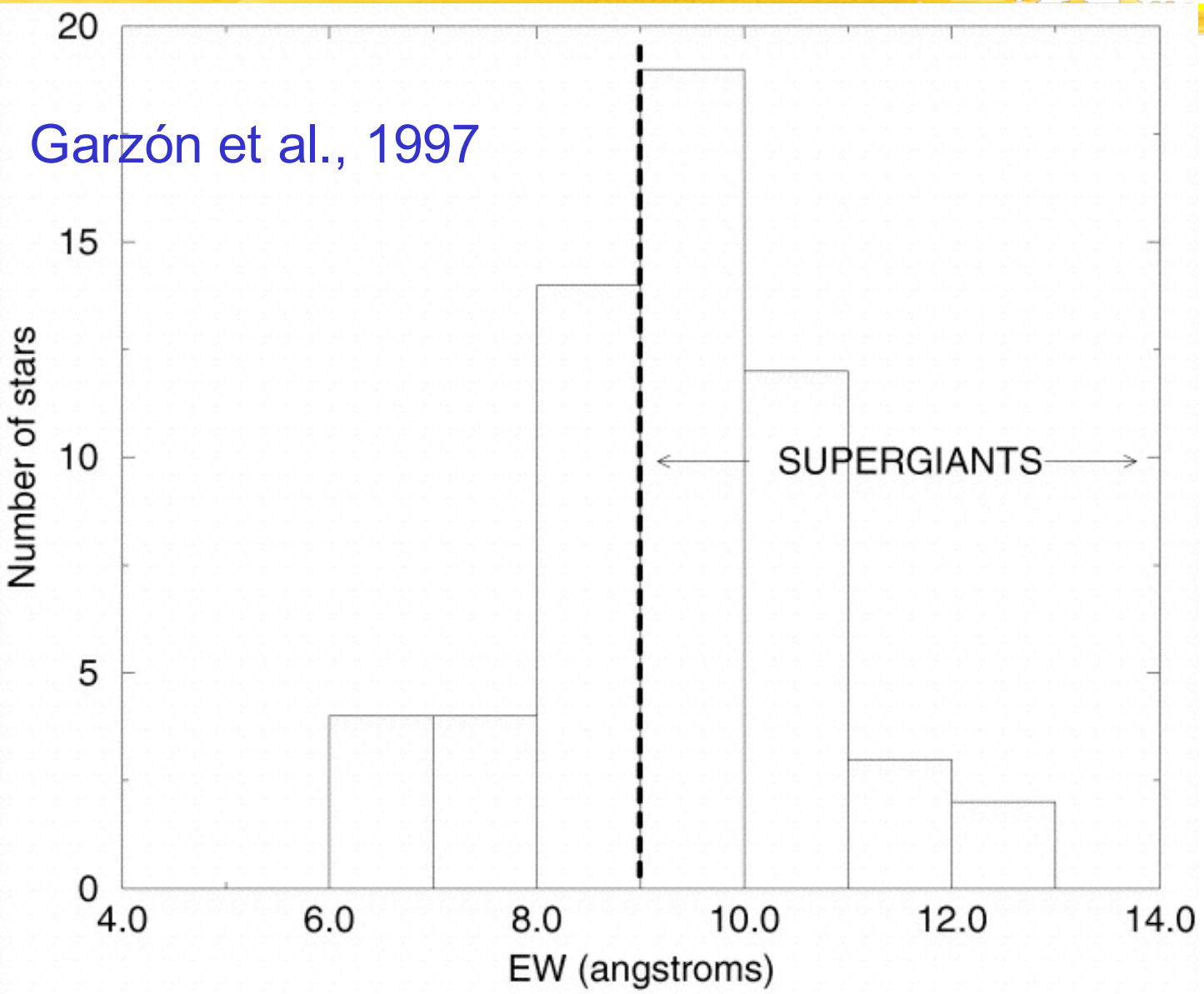




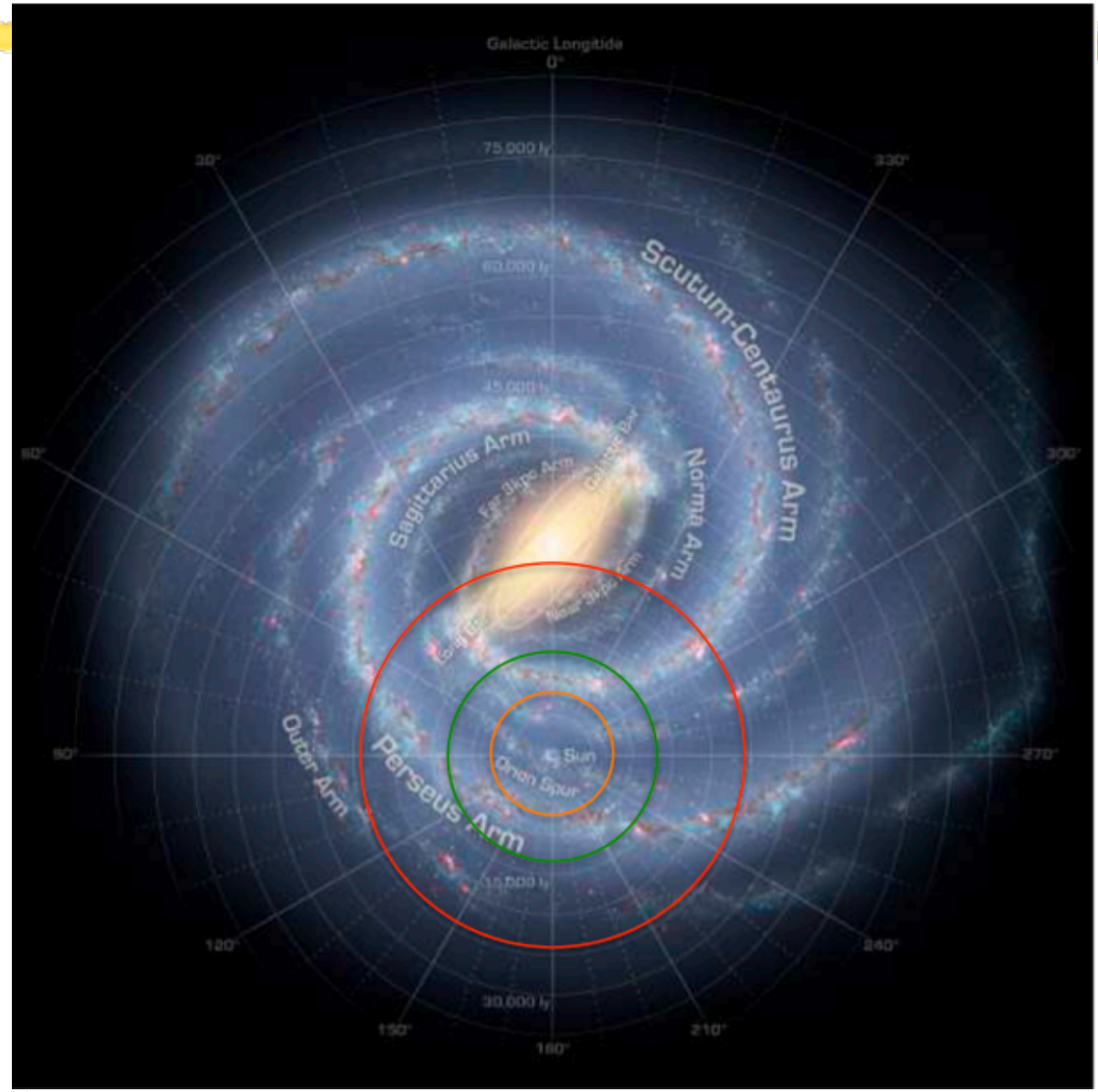




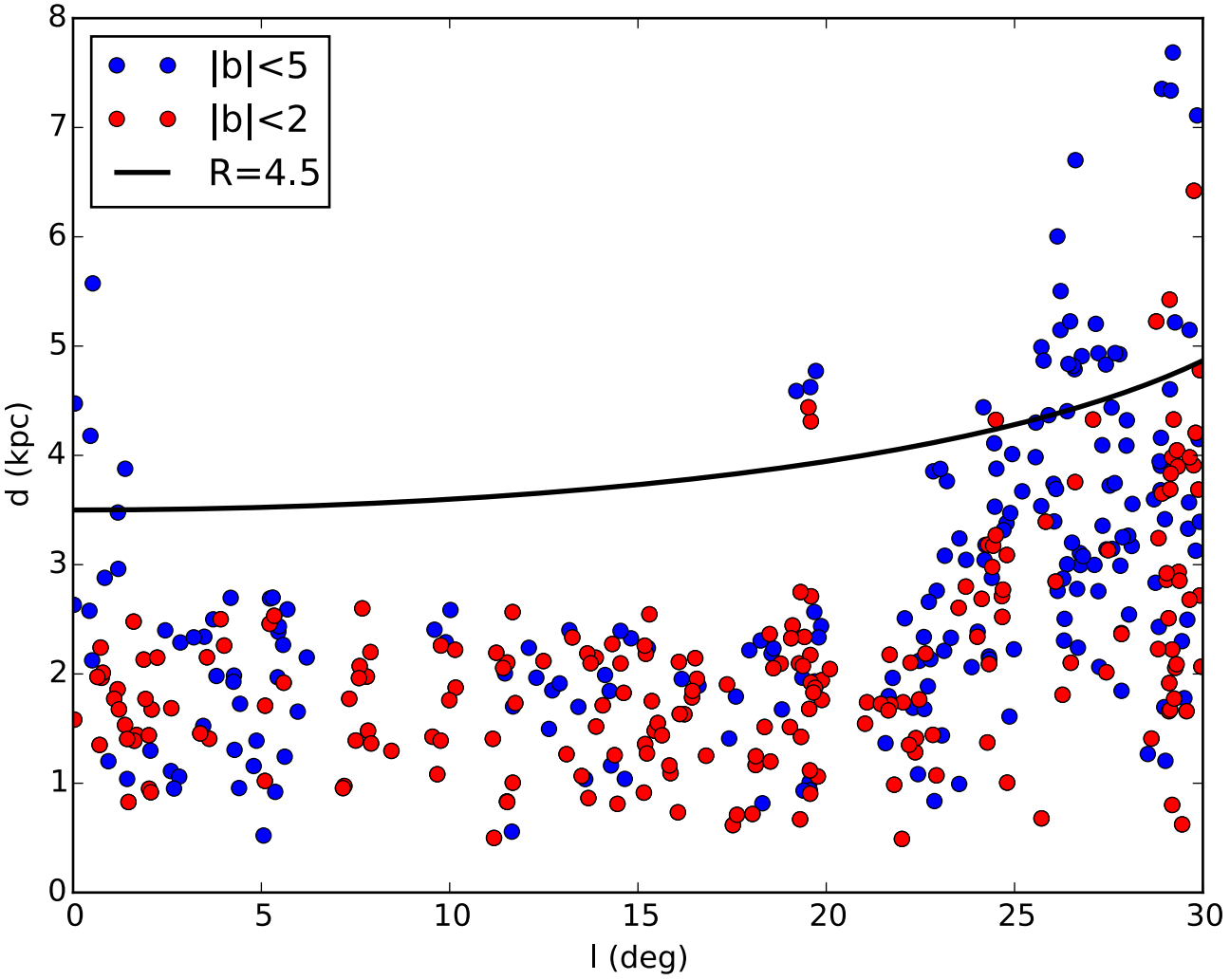
GALEP: the motivation



Why EMIR


Galactic Longitude
0°
30°
330°
60°
300°
90°
270°
120°
240°
150°
210°
180°
75,000 ly
60,000 ly
45,000 ly
30,000 ly
15,000 ly
Scutum-Centaurus Arm
Sagittarius Arm
Far 3kpc Arm
Galactic Bar
Norma Arm
Near 3kpc Arm
Local Arm
Sun
Orion Spur
Perseus Arm
Outer Arm

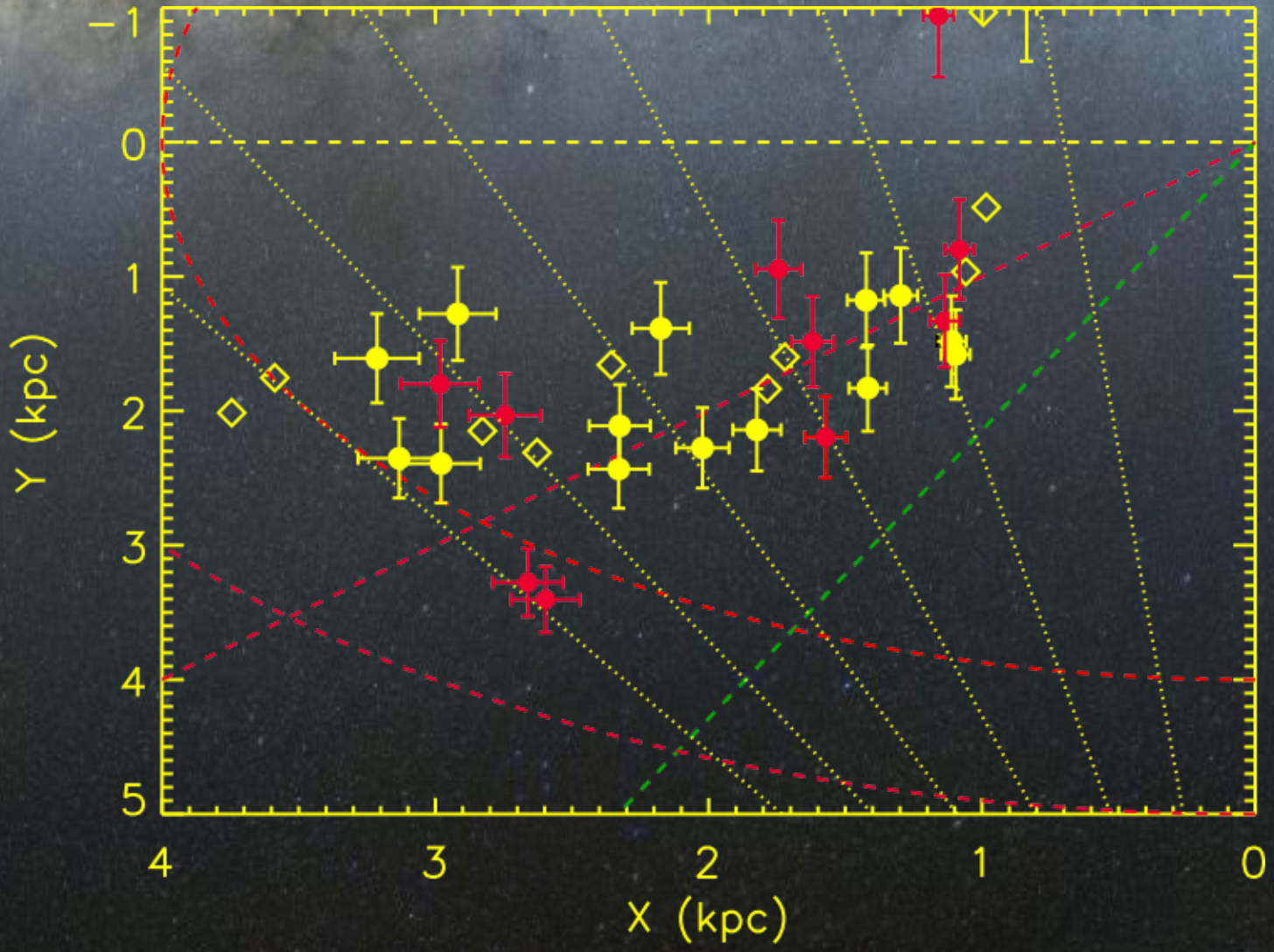
Why EMIR



GALEP: the case

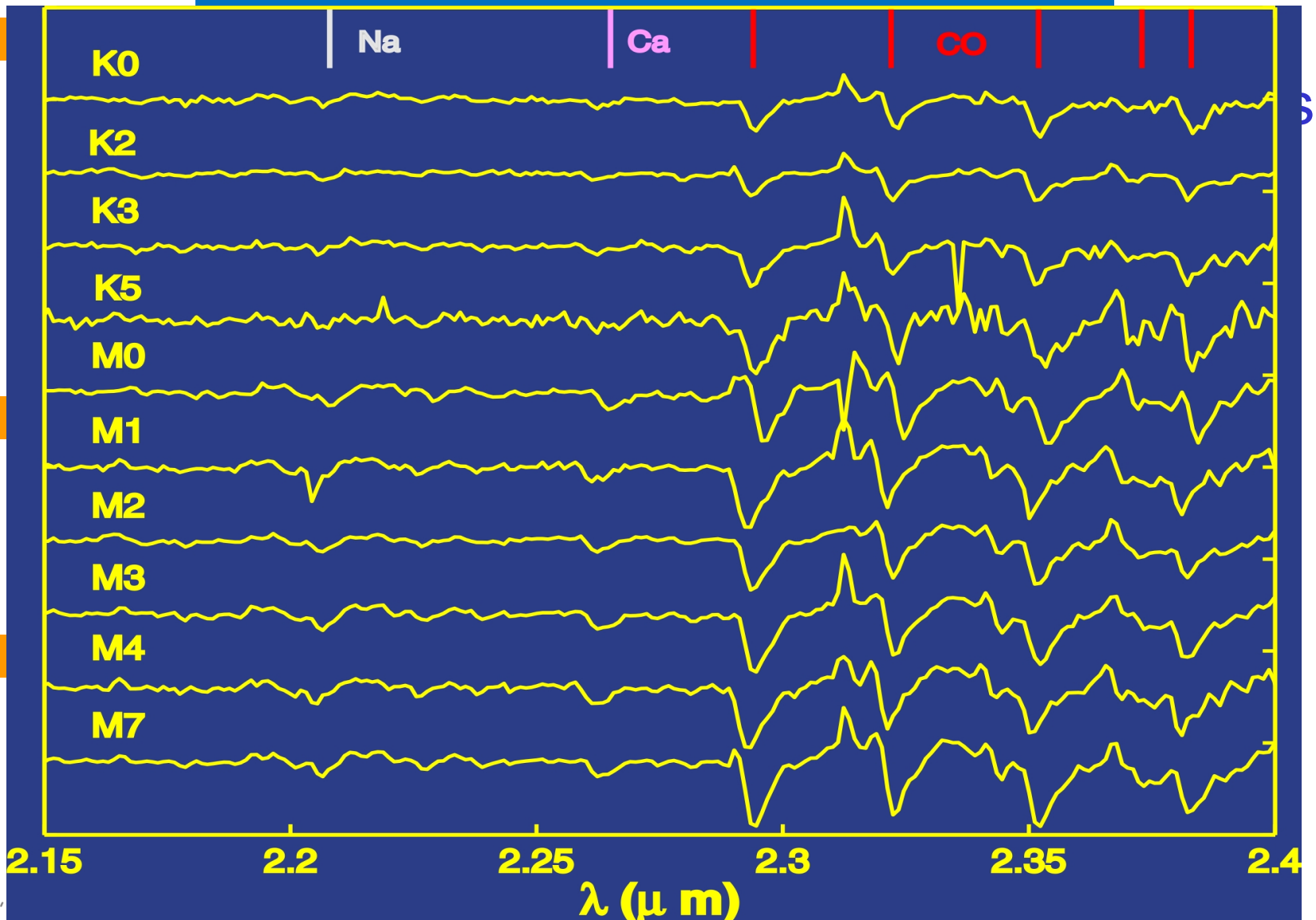
- Use EMIR to obtain near IR spectroscopy of many thousands sources
  - vast majority located in the inner Galaxy
  - selected from their position on IR colour-magnitude diagrams
  - will include disc, bar, bulge and ring sources.
- Main aim is to accurately classify the sources
  - to provide a better understanding of the redder parts of a infrared CM diagram.
- Tackle ambiguities in the interpretation of structures in the inner Galaxy.

Internal Structure

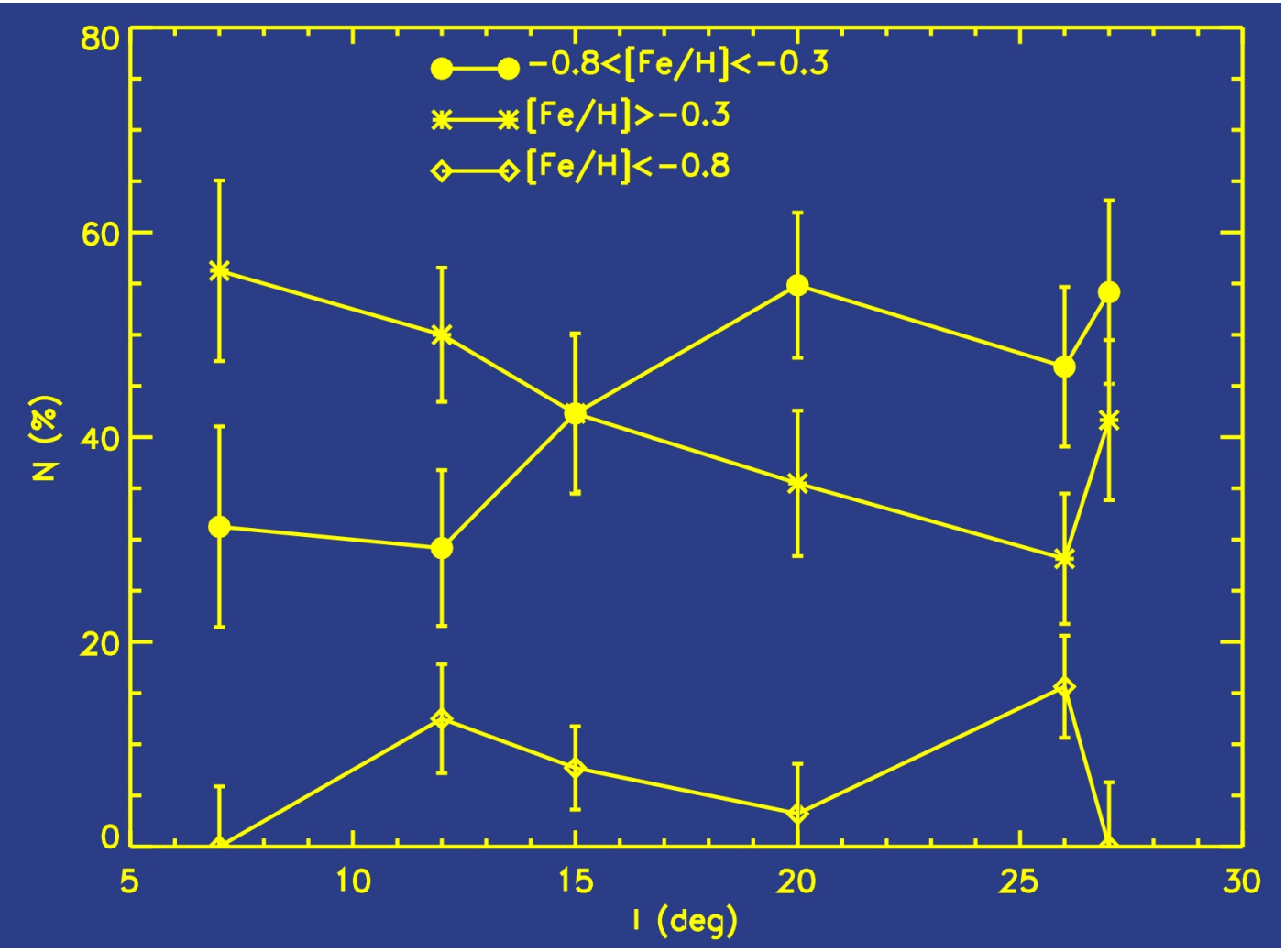


GALEP: the case

Spectra: HK (R~500) with NICS+TNG

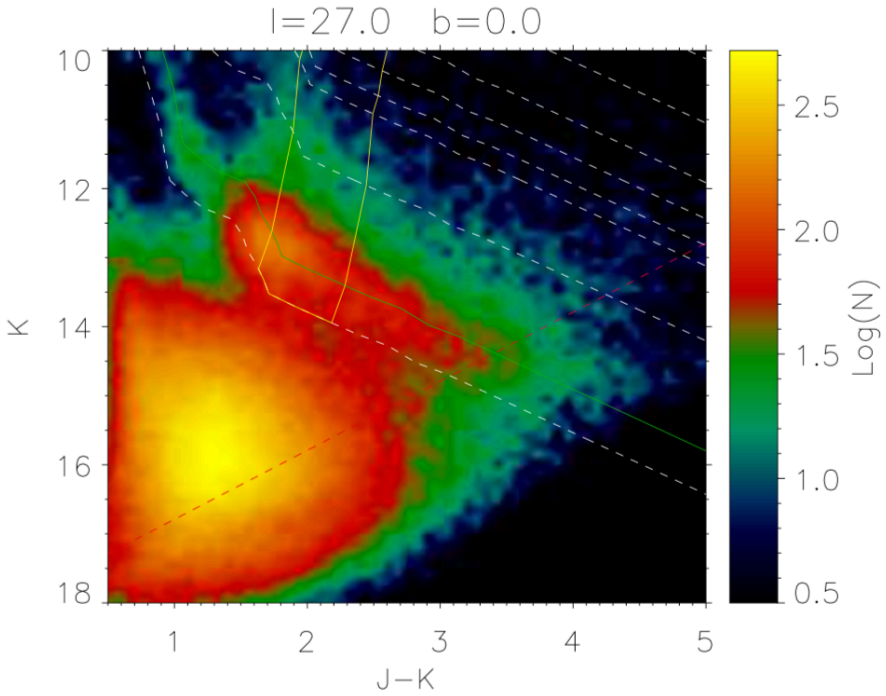


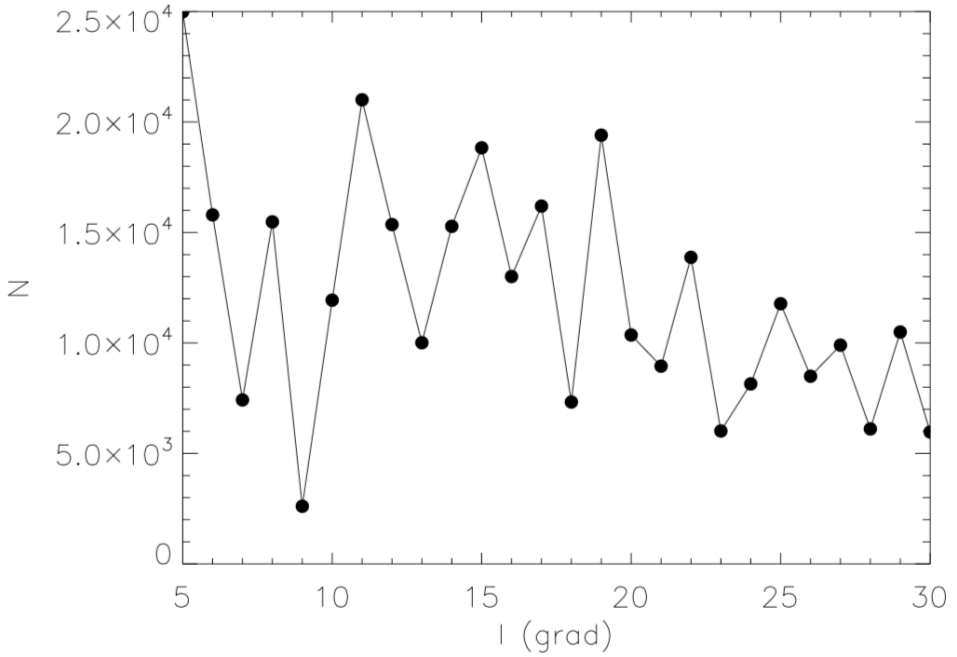
Ongoing preparatory work



2008A&A 479 131G: González-Fernández et al.

Source selection





GALEP: the case

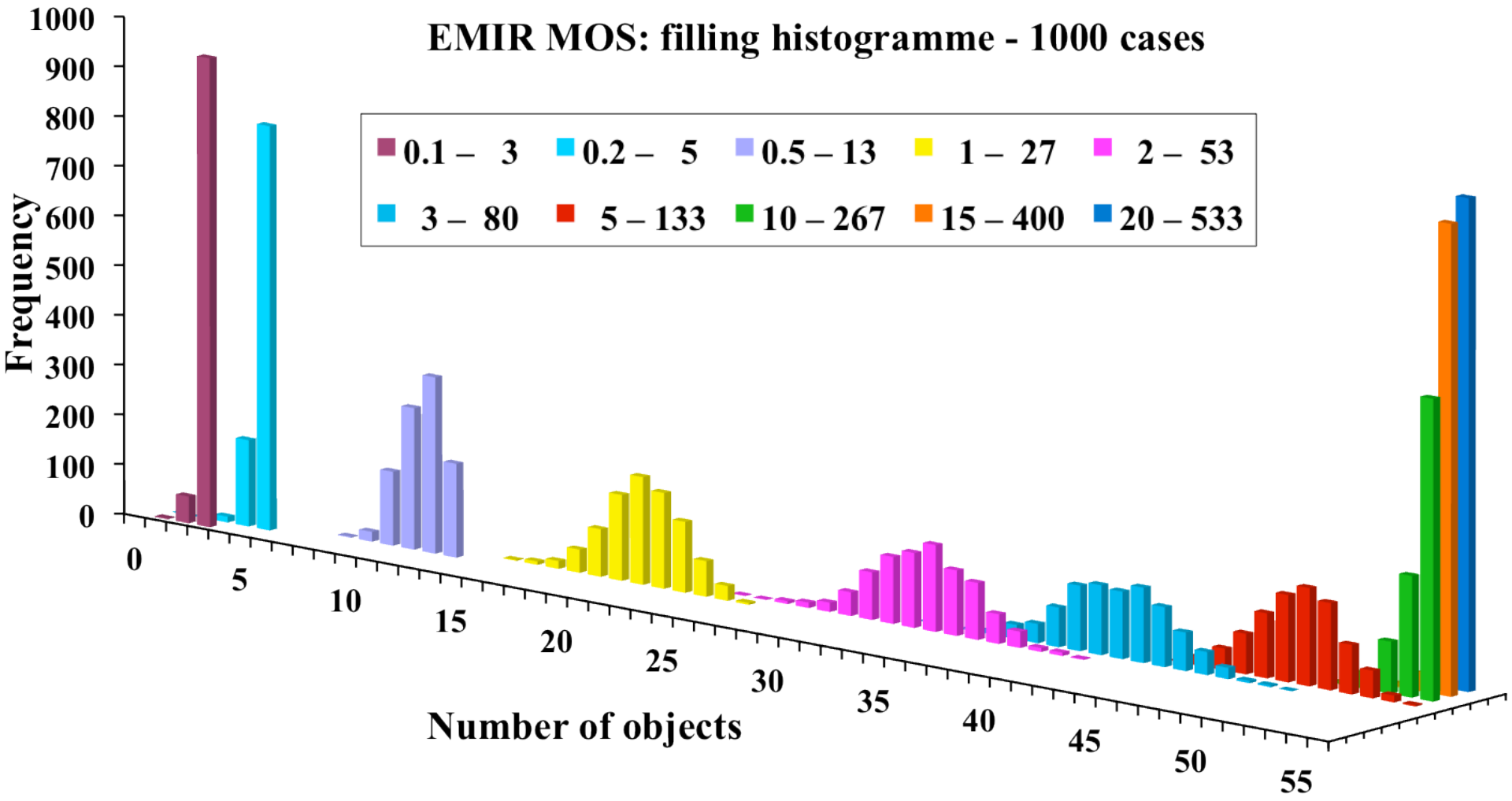
- Additional goal: the measurement of radial velocities for using kinematics as a tool for classifying the different populations.

- EMIR will deliver velocity resolutions of 70 and 75 Kms^{-1} (H & K)
  - v_los at the end of the bar ~ 80 Kms^{-1}
  - depending upon instr. stability ➔ ability to measure velocities to 10% of the resolution
    - 7 to 20 km/h
    - high S/N required, but many bright sources
      - narrower slit

GALEP: the project

- A necessary step forward
  - after the large Galactic surveys (optical, NIR, …)
  - While GAIA, as a complement
- Now, the positions of large set of stars in CMDs are known
  - adequate sample selection
  - “blind” configuration of MOS instrument
    - high observational efficiency

GALEP: MOS coverage



estimates: K

Point Source (Vega Mag) = 16.000 K

Template: Black Body

Temperature = 6000.0 K

OBSERVATION:

Operation: Spectroscopy

Exposure time(s) = 960.0

Number of exposures: Object 1, Sky 1

TELESCOPE AND INSTRUMENT:

Telescope collecting area = 73.0 m^2

Spatial scale = 0.1922 arcsec/pix

Readout noise = 15.0 e^-

Dark current = 180.00 ADU/hour

Well depth = 147001.0 e^-

Gain = 3.33 e^-/ADU

Effective gain = 3.33

Grism: K

Slit width = 0.80 arcsec

Wavelength coverage = 2.03 - 2.39 μ

Central wavelength = 2.2091

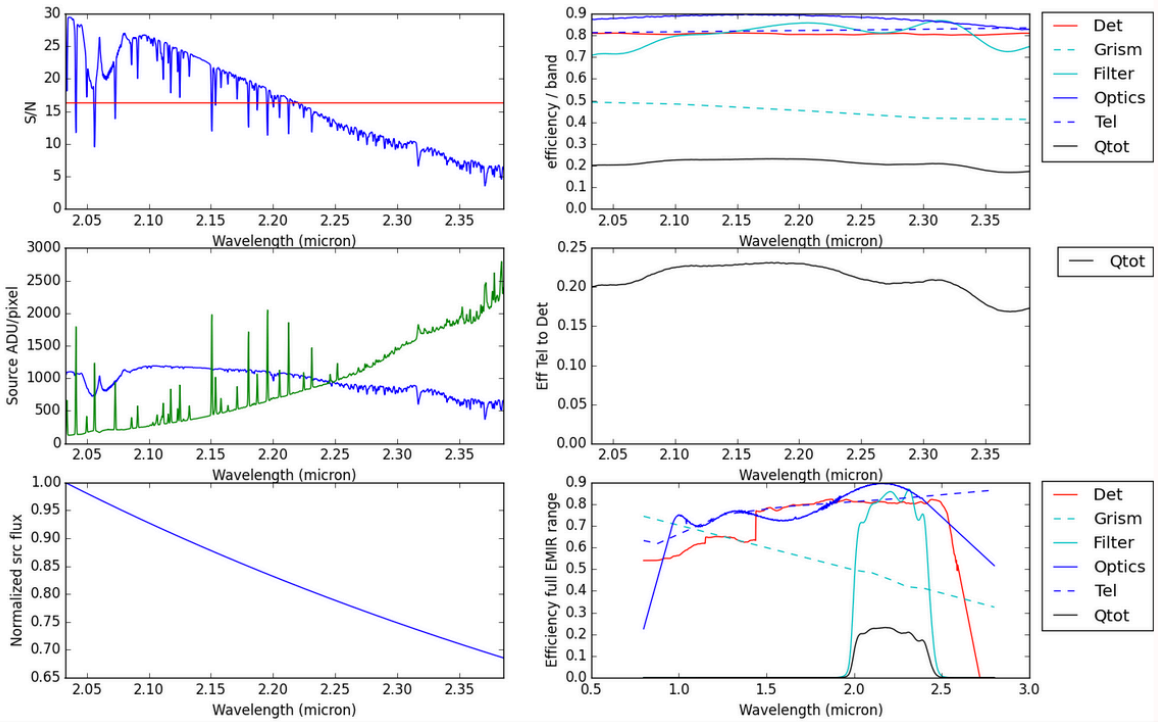
RESULTS:

For 1 exposure(s) of 960.0 s:

Median counts per res. element: from object = 1997.6, from sky = 1599.7

Median S/N per res. element = 33.3

Median S/N per pixel = 16.3



ETC estimates: H

SOURCE:

Point Source (Vega Mag) = 17.000 H

Template: Black Body

Temperature = 6000.0 K

OBSERVATION:

Operation: Spectroscopy

Exposure time(s) = 960.0

Number of exposures: Object 1, Sky 1

TELESCOPE AND INSTRUMENT:

Telescope collecting area = 73.0 m^2

Spatial scale = 0.1922 arcsec/pix

Readout noise = 15.0 e^-

Dark current = 180.00 ADU/hour

Well depth = 147001.0 e^-

Gain = 3.33 e^-/ADU

Effective gain = 3.33

Grism: H

Slit width = 0.80 arcsec

Wavelength coverage = 1.50 - 1.75 μ

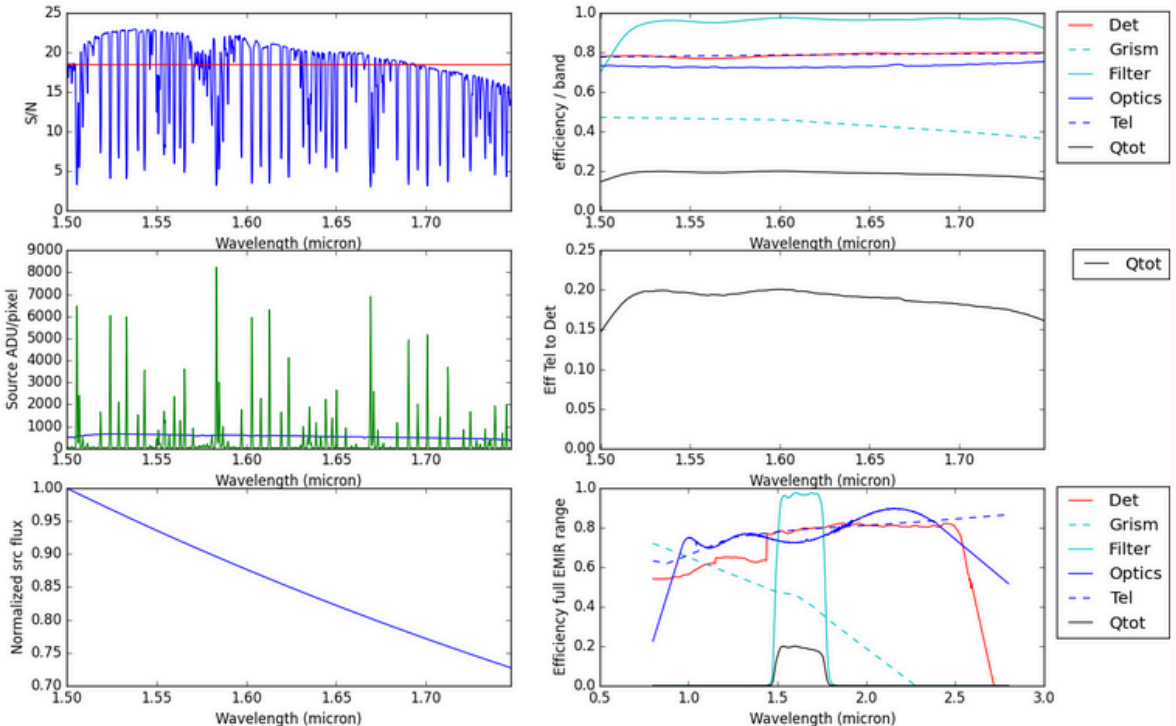
RESULTS:

For 1 exposure(s) of 960.0 s:

Median counts per res. element: from object = 1136.1, from sky = 50.0

Median S/N per res. element = 37.7

Median S/N per pixel = 18.5



GALEP: obs. strategy

Field Positions Area/field	#Fields	#Points. /field	#Frames /Point.	#Objs. /frame	Total Frames	Total Objects
$0^o<\ell<40^o$, $\|b\|=0^o,0.5^o$ $\Delta\ell=4^o$, 15'x15'	30	8	4	40	960	38400
$40^o<\ell<100^o$, $\|b\|=0^o,0.5^o$ $\Delta\ell=10^o$, 15'x15'	18	8	2	30	288	8640
$100^o<\ell<200^o$, $\|b\|=0^o,0.5^o$ $\Delta\ell=20^o$, 15'x15'	15	8	1	8	120	960
TOTAL	**63**				**1368**	**48000**

GALEP

- Ks < 16.5^{mag}
- H < 18.5 / 19.5^{mag}

Item	Mode	Band	S/N	Int. Time
Peaking-up	Image	J,H or K_S	5	5s
Multislit check	Image	J,H or K_S	5	5s
MOS measurement	MOS	$H\&K_S$	50	~2000s
			Total	**2000s / 33min**

➔approx. 65 / 70 nights at GTC