Gaia and large scale galactic structure

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Summary

- Gaia capability and the Galaxy
- Galactic Disc
- Inner Galaxy
- Indirect methods

Gaia capability

- Astrometry

V=15 - 12 to 25 μmas

V=20 100 to 300 μmas

  - 10% parallax error at 4 kpc for B stars

    but 7-8 kpc for cool stars

- Photometric precision

mV=15 0.01 to 0.1mag

- Radial velocity to mV=17

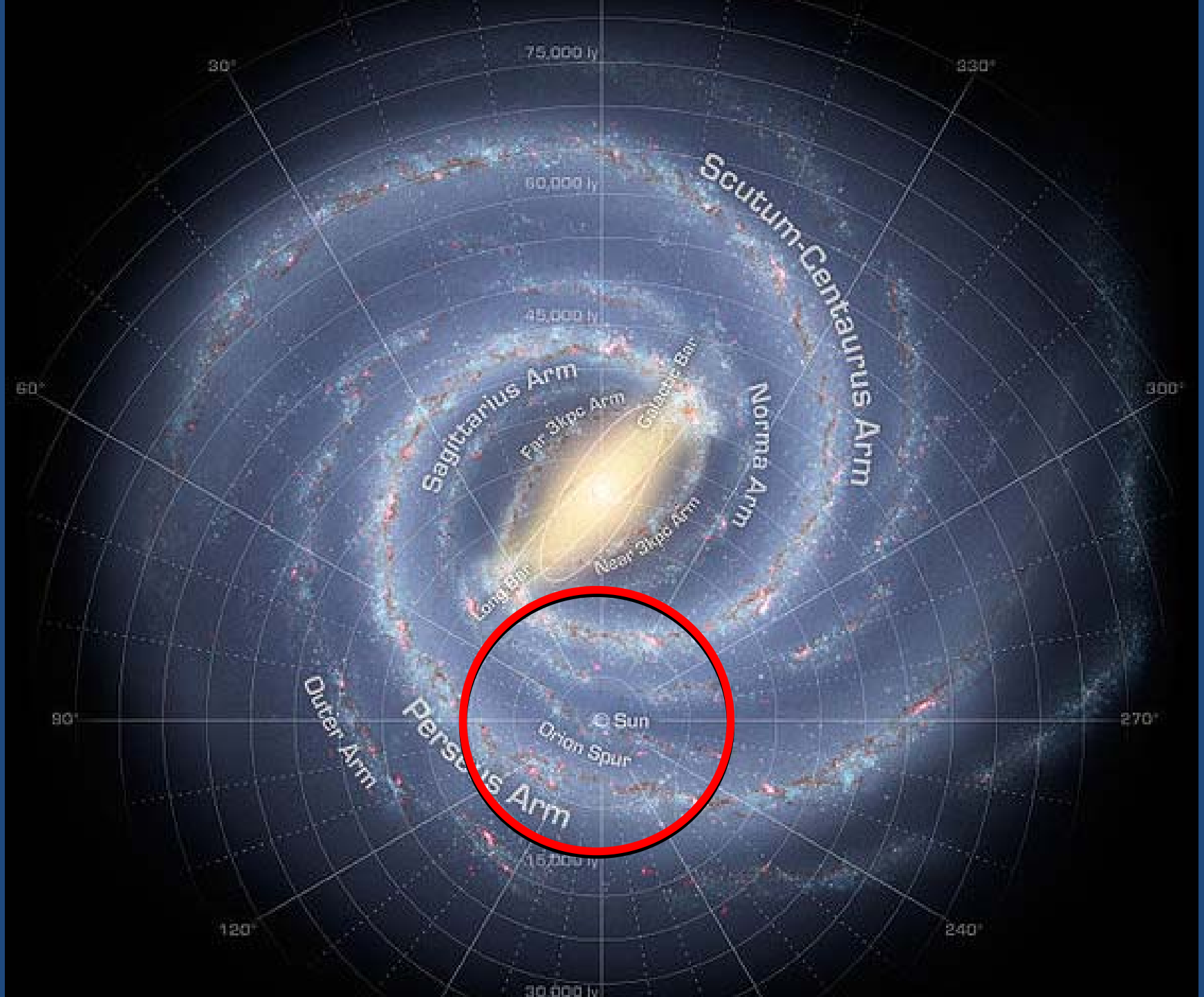
Gaia capability II

- Melaticity mG<18 0.1-0.5 dex

Distance, without extinction, at which stars have mV=+15

	MV	distance for mV=15
A0V	0.2	9 kpc
GOV	4.5	1.2 kpc
K2III	1.1	6 kpc

In plane max distance limit about 3kpc


75,000 ly
60,000 ly
45,000 ly
30°
330°
60°
300°
90°
270°
120°
240°
Scutum-Centaurus Arm
Sagittarius Arm
Far 3kpc Arm
Galactic Bar
Norma Arm
Near 3kpc Arm
Long Bar
Outer Arm
Perseus Arm
Sun
Orion Spur

Gaia and the Disc

- Thin disc and Thick disc
- Spiral arms
- Warp
- Cut off ???
- Local extinction

  - Scale lengths and heights variation with spectral type
  - Metalicity
  - Luminosity function

Gaia and the Inner Galaxy

- Must look out of the plane

- Bulge sources will be directly measureable in the red giants
- In plane sources from the bar and inner disc unlikely to be detected.

Indirect methods

- Kinematics
  - Moving groups

- Accurate determination of the Luminosity function- allowing better star counts models.

Sumary

- Gaia will revolutionize our understanding of the large scale structure both through direct and indirect methods.