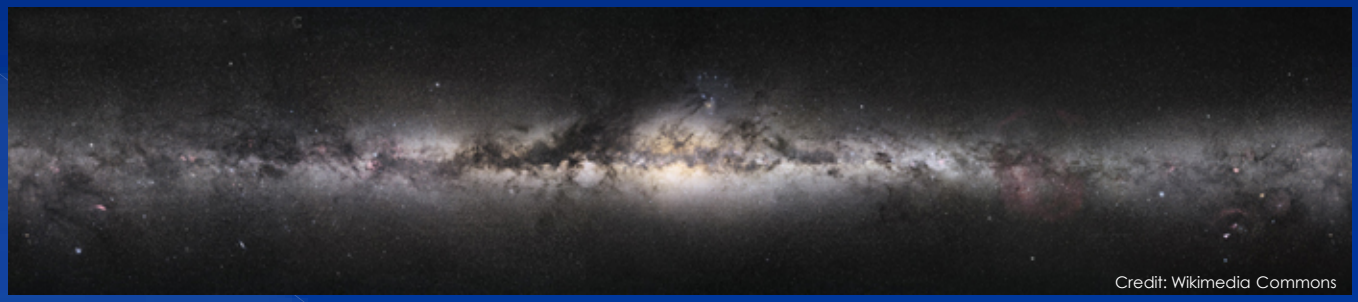
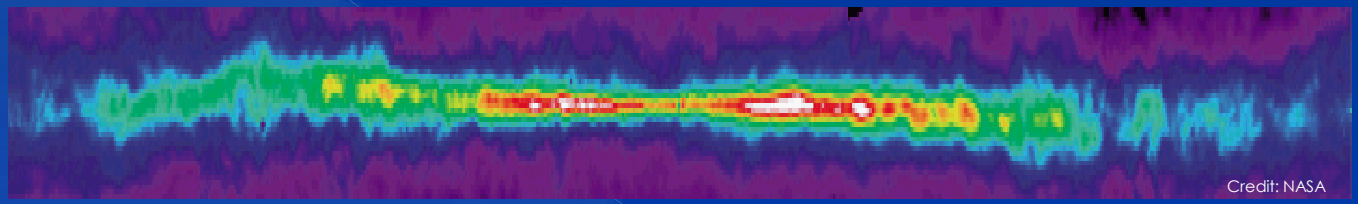

Credit: Wikimedia Commons


Credit: NASA

Radio Mapping of the Milky Way Galaxy

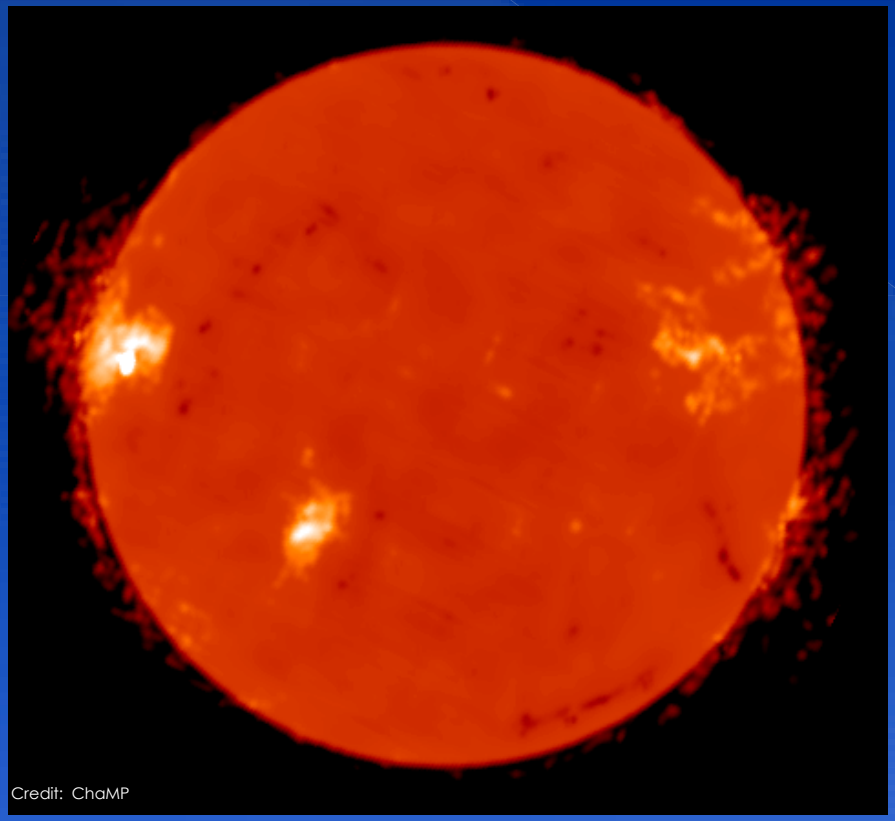
By Matthew Hankins

Radio Astronomy

The Moon

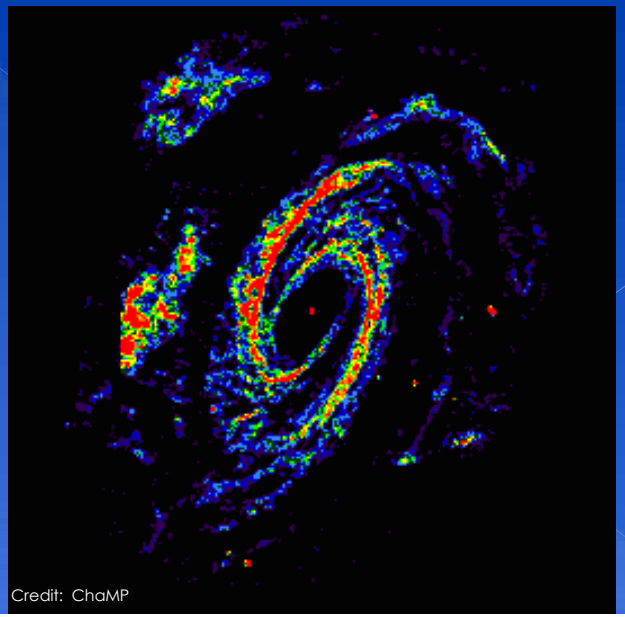
Credit: ChaMP

The Sun



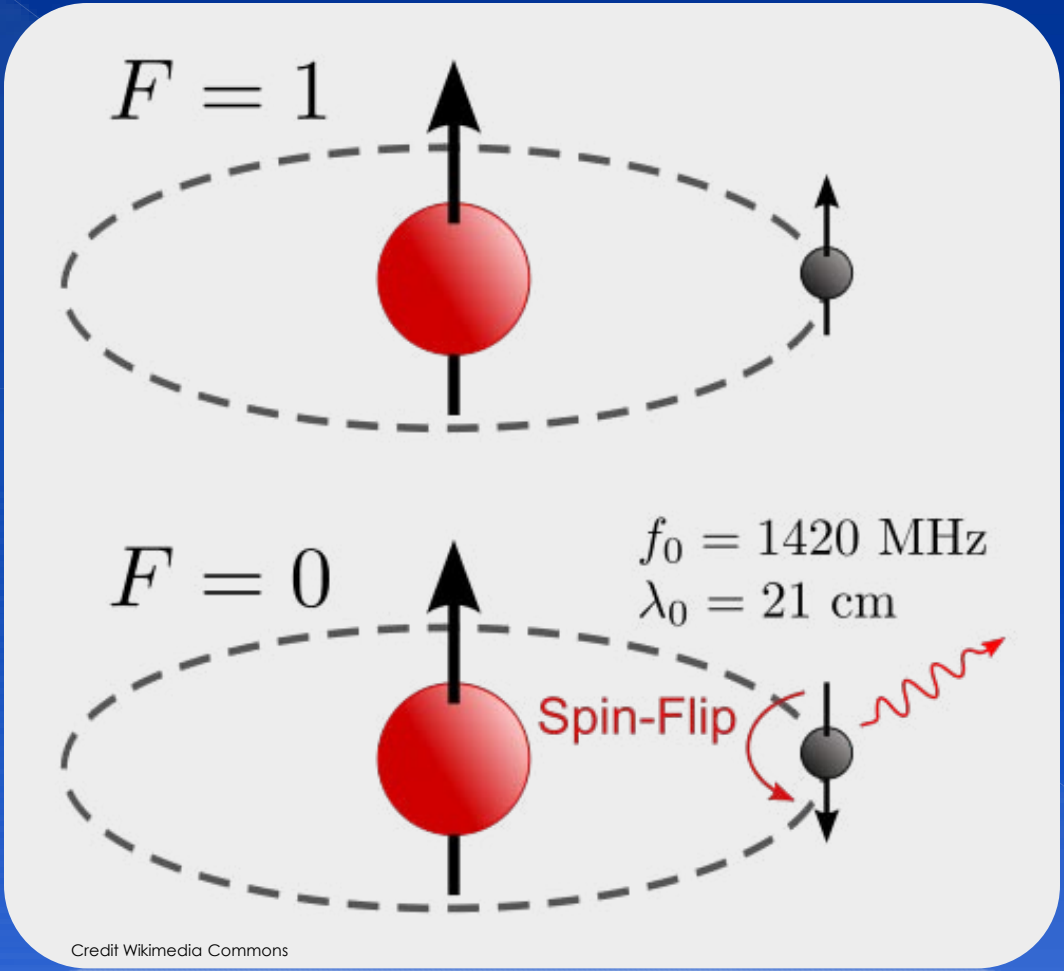
Credit: ChaMP

M-81



Credit: ChaMP

Theory



Credit Wikimedia Commons

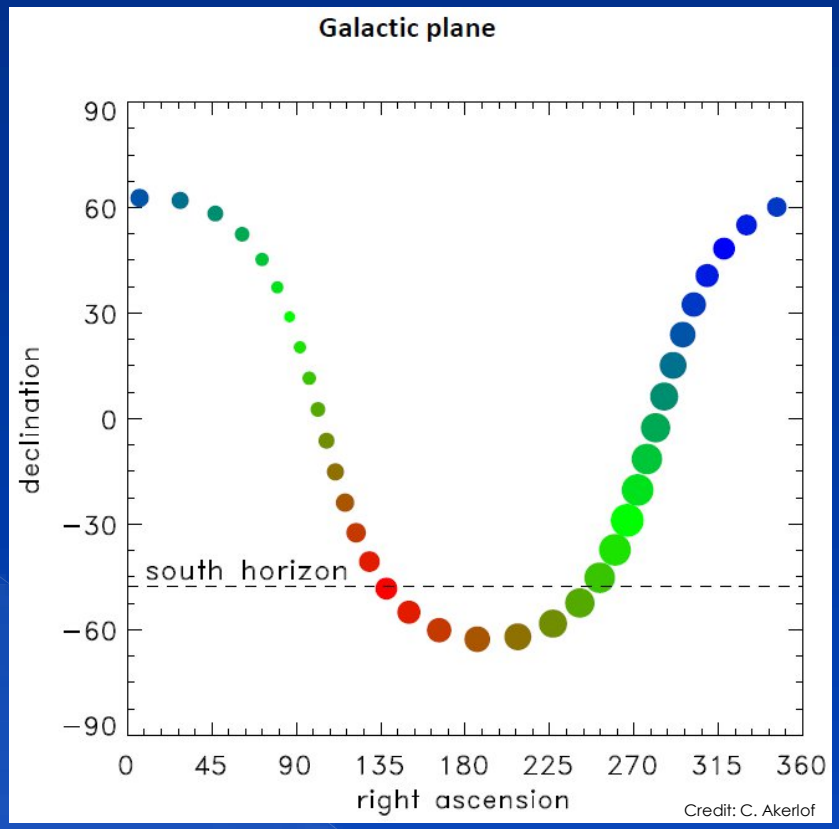


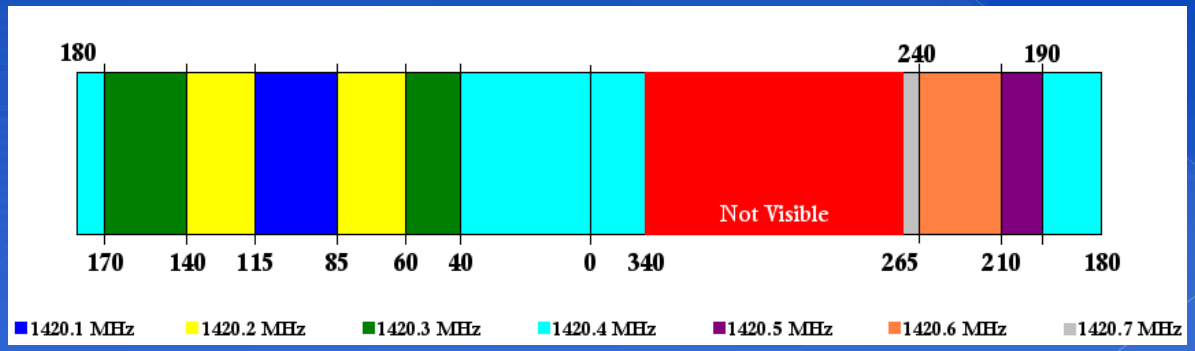
Small Radio Telescope

- Aperture: 2.1 m
- Frequency range:
  1400-1440 MHz
- Bandwidth:
  1.21875 MHz

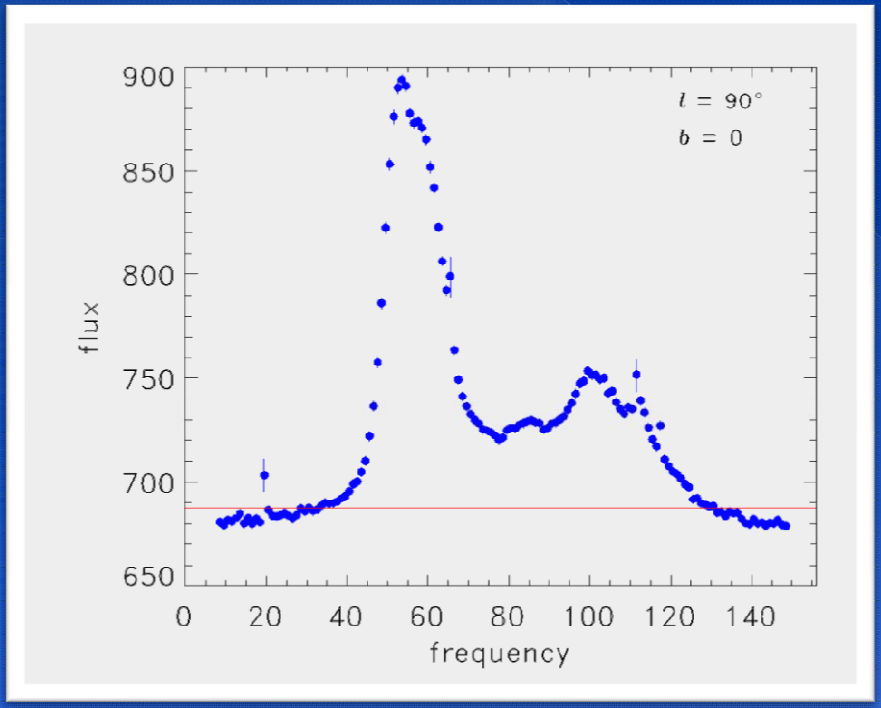
Planning Stages:

- Location
- Frequency

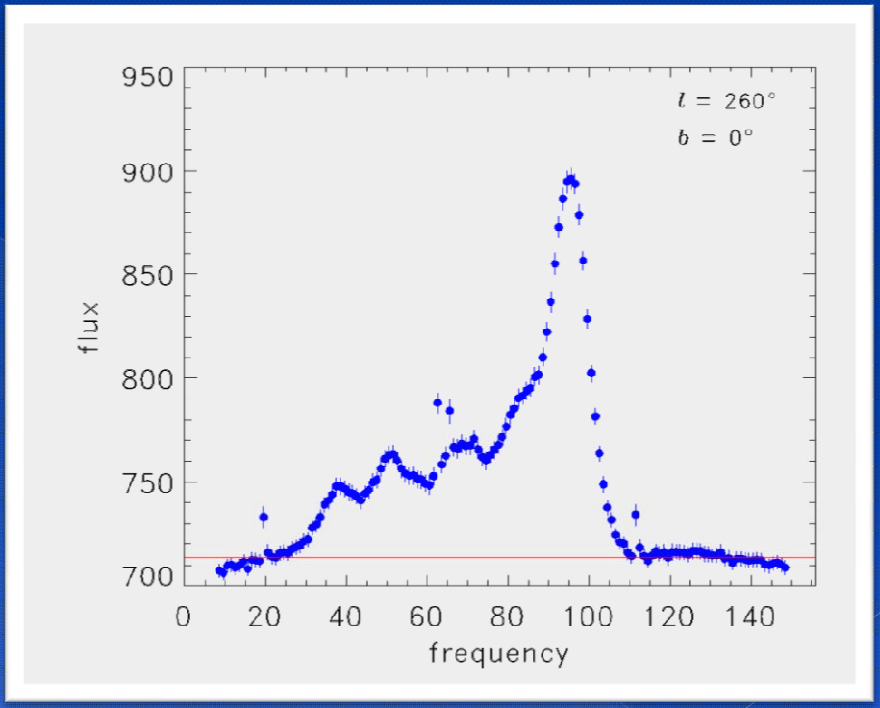




Doppler Shifting



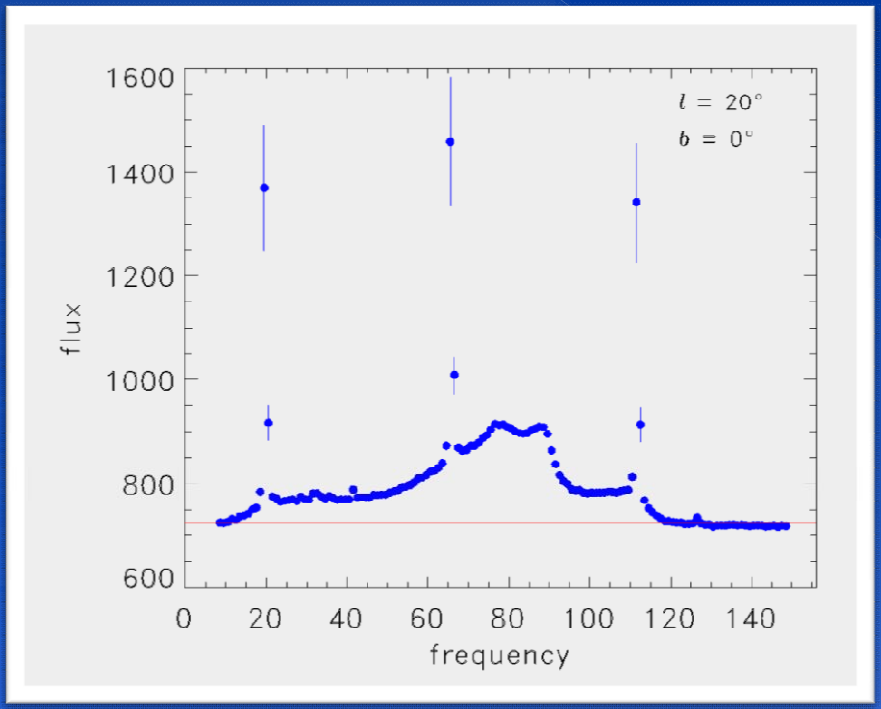
Center Frequency: 1420. 1 MHz



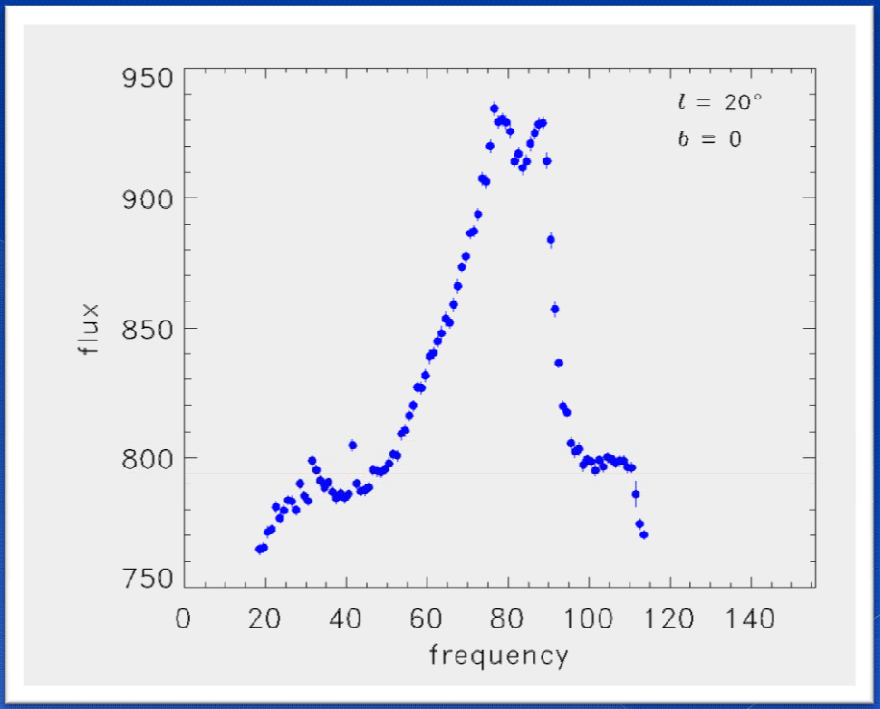
Center Frequency: 1420. 7 MHz

Data Filtering

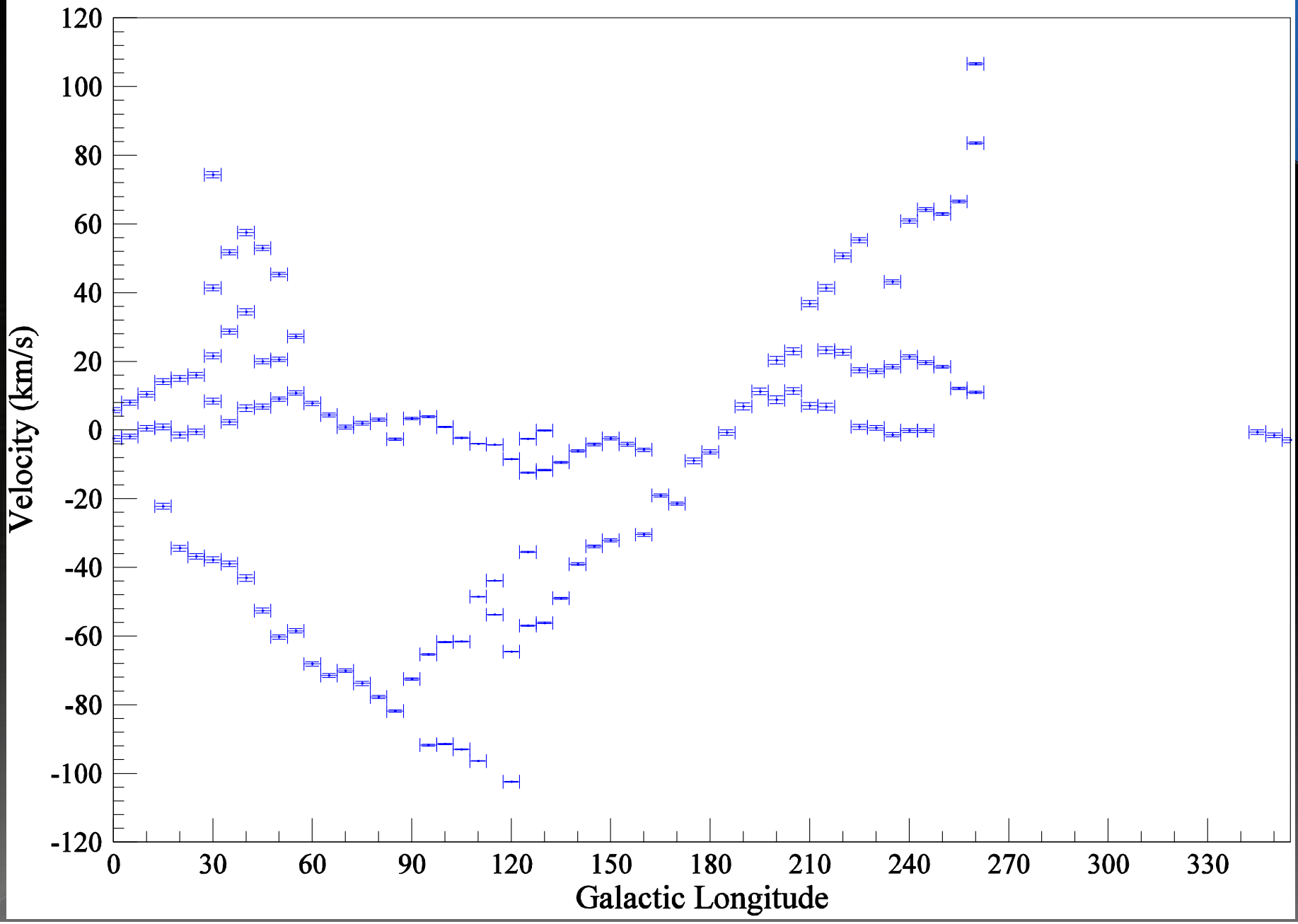
Before



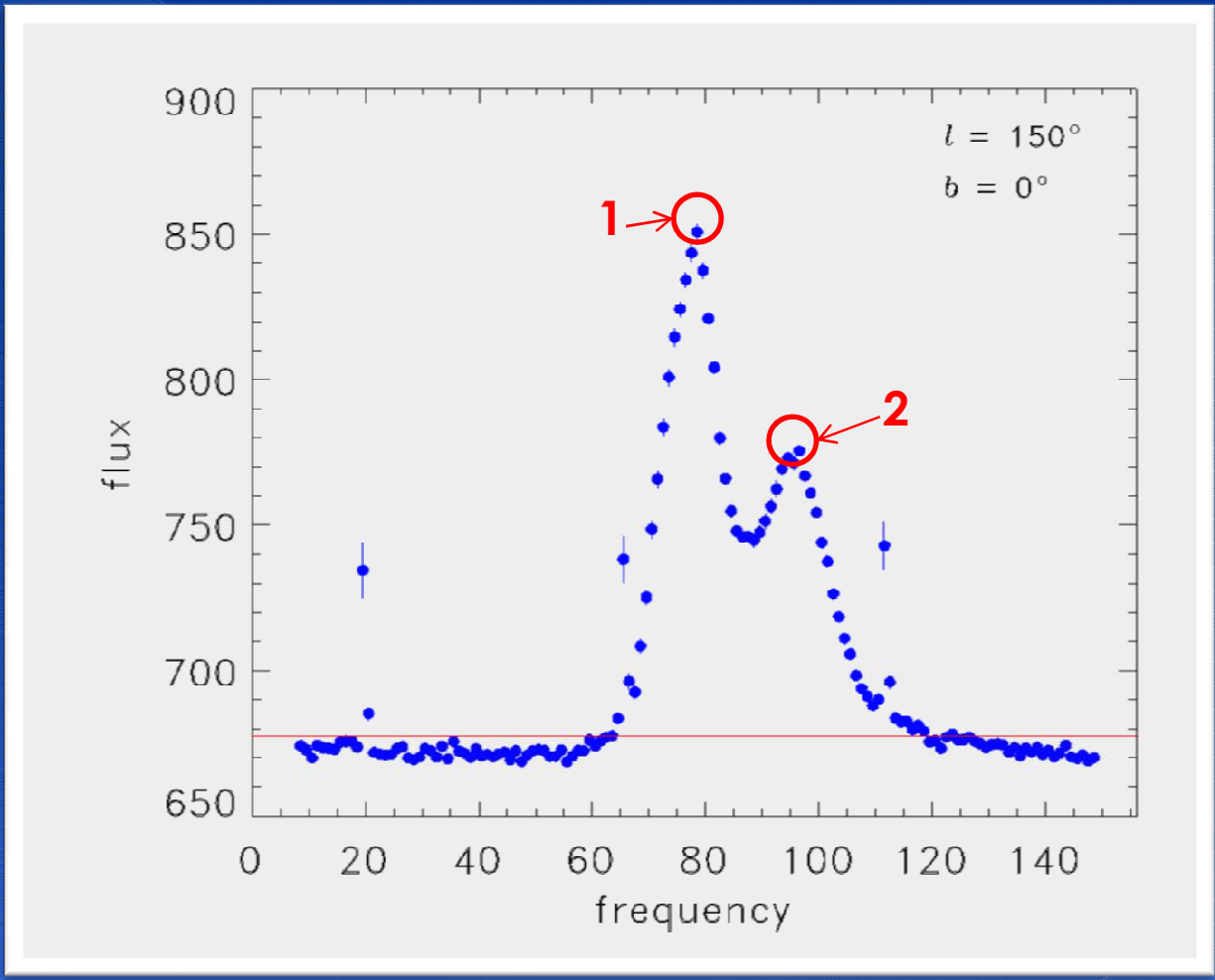
After



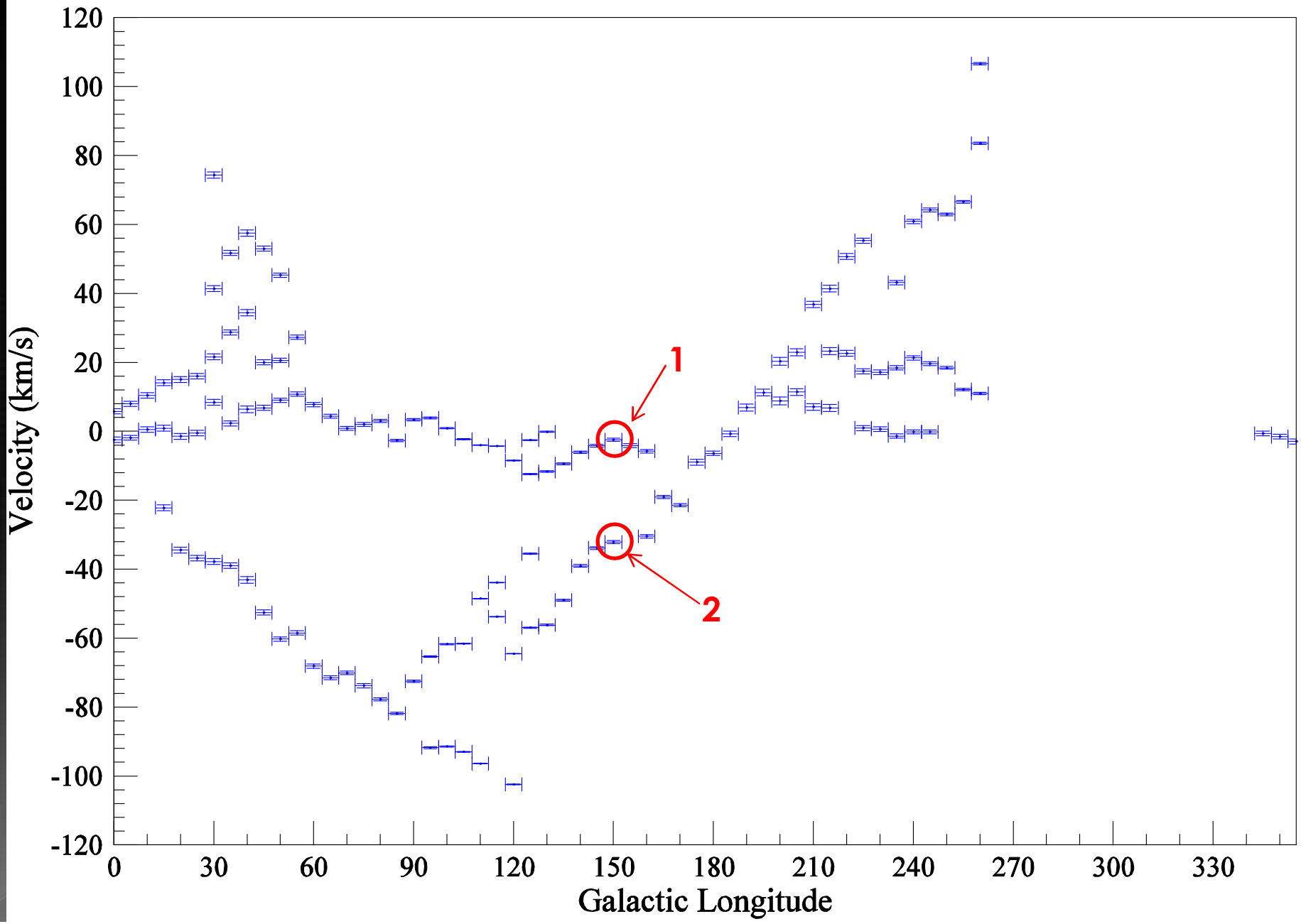
Local Standard of Rest Velocities



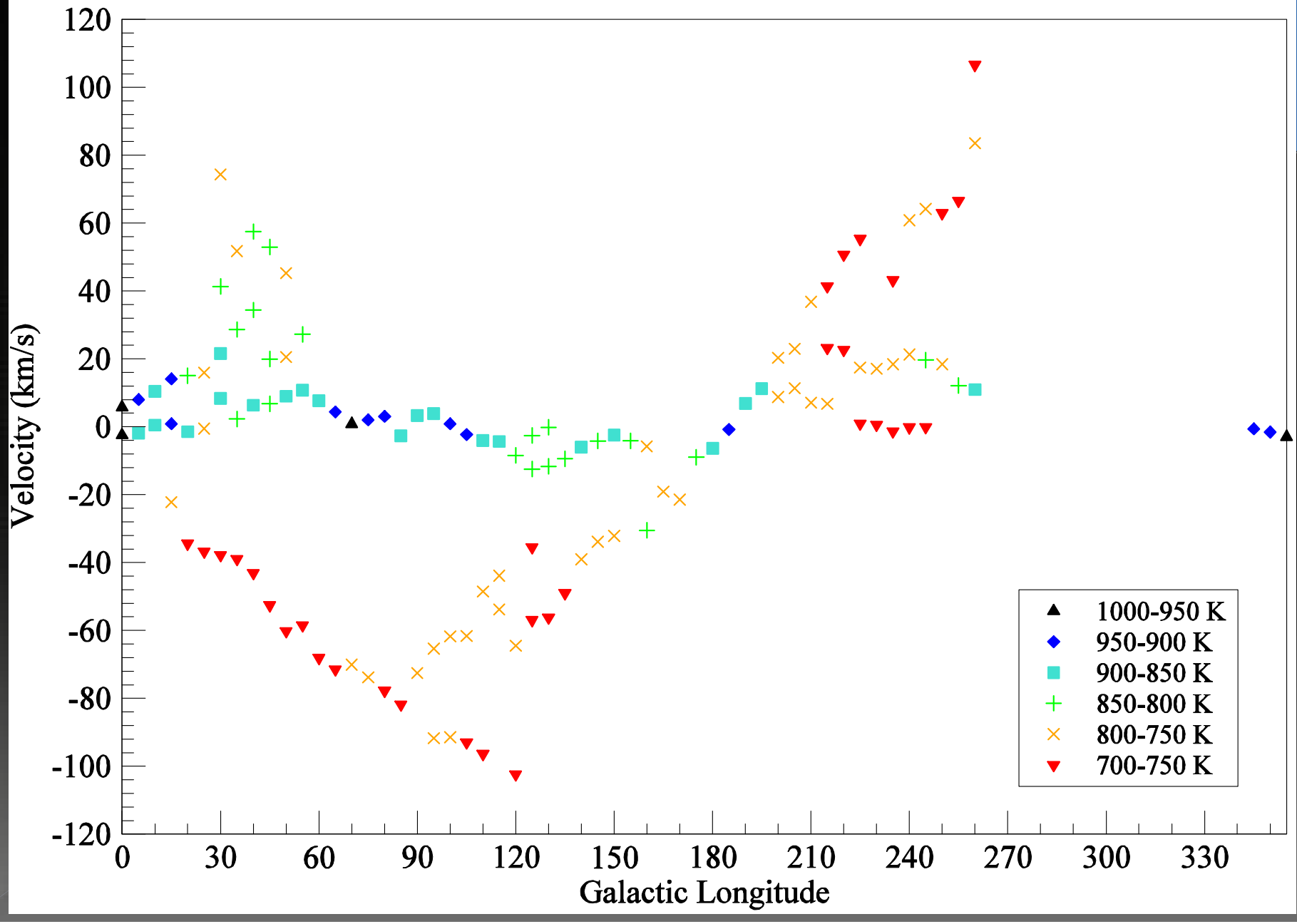
Galactic Longitude 150°

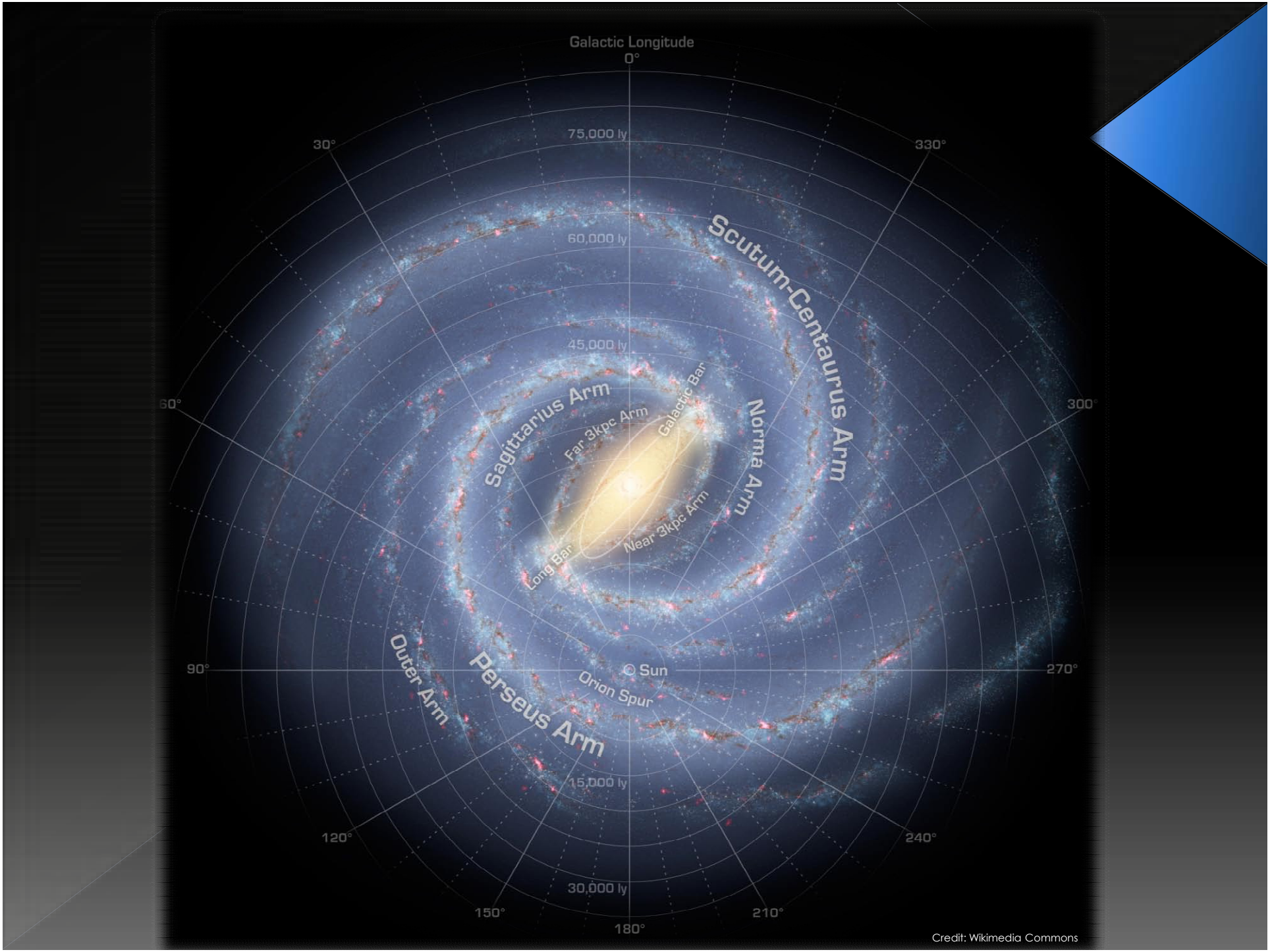


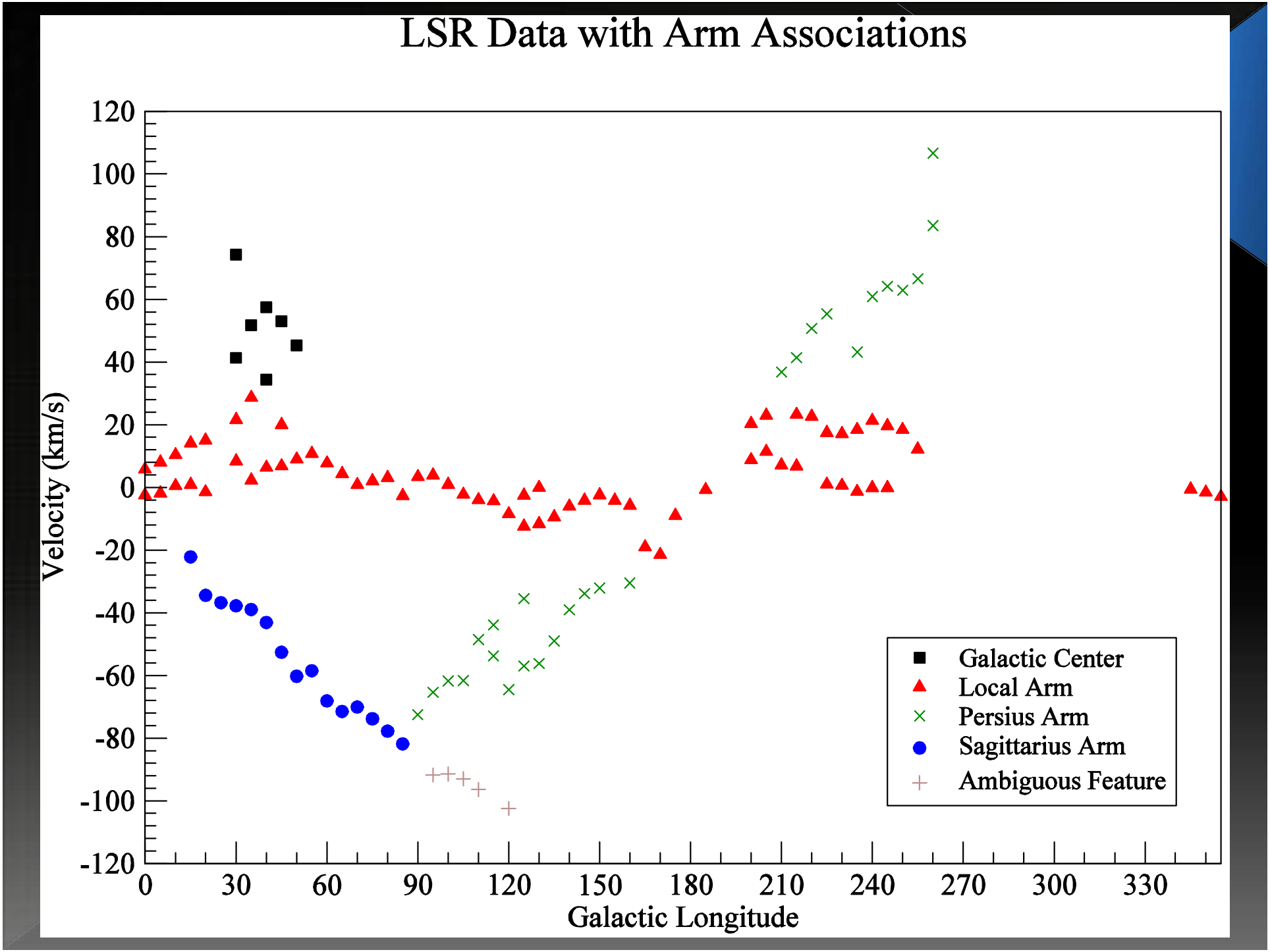
Local Standard of Rest Velocities



LSR Velocities with Respect to Intensity




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
Norma Arm
Perseus Arm
Outer Arm
Far 3kpc Arm
Near 3kpc Arm
Galactic Bar
Long Bar
Sun
Orion Spur
Credit: Wikimedia Commons


LSR Data with Arm Associations
Velocity (km/s)
120
100
80
60
40
20
0
-20
-40
-60
-80
-100
-120
0
30
60
90
120
150
180
210
240
270
300
330
Galactic Longitude
Galactic Center
Local Arm
Persius Arm
Sagittarius Arm
Ambiguous Feature

Resources

- An introduction to radio astronomy by Bernard F. Burke and Francis Graham-Smith
- http://astro.u-strasbg.fr/~koppen/Haystack/rotation.html
- http://www.astro.cornell.edu/academics/courses/astro101/herter/astro101.htm
- http://www.farnham-as.co.uk/2010/09/mapping-neutral-hydrogen-in-the-milky-way-galaxy-by-peter-campbell-burns/
- http://mwmw.gsfc.nasa.gov/mmw_images.html
- http://hea-www.harvard.edu/CHAMP/EDUCATION/PUBLIC/pictures.html
- http://www.haystack.mit.edu/edu/undergrad/srt/SRT%20Projects/rotation.html
- http://www.phys.vt.edu/~jhs/phys3154/srtguide.pdf
- http://www.haystack.mit.edu/edu/undergrad/srt/index.html

Thank You

Questions?