11.16: Magnitude System

The **magnitude system** is a scale to show how bright stars appear. The initial magnitude system was developed by the Greek astronomer, geographer, and mathematician Hipparchus (190 BC to 120 BC). He ranked stars by their apparent brightness, with 1 being the brightest and 6 being barely visible, without the telescope or other optical aid.

He also designed his original magnitude scale, such that the star Polaris, the northern hemisphere's pole star, would have a magnitude of 2. Hipparchus' initial magnitude scale was revised by Norman Pogson in 1856. Pogson specified a 1st magnitude star is 100 times brighter than a 6th magnitude star. Based on Pogson's system, a 1st magnitude star is 2. 512 times as bright as a 2nd magnitude star. With this revision also came inclusion of brighter objects, such as the Sun and Moon, and fainter objects then visible through the telescope. What we see in our sky is called an object's **Apparent Magnitude, M_v**.

Example Apparent Magnitudes, M_v

Object

- Sun
- Moon
- Sirius (brightest star in the sky beyond the Sun)
- Polaris, the northern hemisphere's pole star
- Andromeda Galaxy, M31
- Maximum brightness of dwarf planet Ceres
- Faintest objects visible using 7×50 binocular
- Pluto at maximum brightness
- Faintest objects observable in visible light with 8m Earth telescopes
- Faintest objects observable in visible light with the Hubble Space Telescope

Apparent Magnitude – as seen from Earth

- -26. 74
- -12. 74
- -1. 4
- 1. 98
- 3. 44
- 6. 64
- 9. 50
- 13. 65
- 27. 00
- 31. 50