Resolution Worksheet: Get your expectations ready! (2020) – L. M. Rebull

Getting started: what sizes do we expect?

Googling to get what you need is expected and ok!

Let's start by calibrating our expectations by thinking about the sizes of things in arcseconds (or arcminutes or degrees) with which we are more familiar before launching into measuring things on the FITS images.

- **Q1.1:** What approximate angular size is the Moon?
- **Q1.2:** What approximate angular size is Jupiter?
- **Q1.3:** What approximate angular size is Proxima Centauri? It is a M5.5 Ve, and so its radius is about 0.15 Rsun. Its parallax is 774.25 milliarcsec.
- **Q1.4:** Put our Sun, with a Kuiper Belt, at the distance of Proxima Centauri. What angular size would the Sun be? The Kuiper Belt? In reality, the circumstellar disk surface brightness is much, much fainter than the central star, but for purposes of this example, let's ignore that. Take the solar radius as 7e5 km and the KB as 6e9 km.
- **Q1.5:** The disk around beta Pictoris is about 1650 AU in radius. (Beta Pic's parallax is 51.44 mas.) What angular size would that be? (Again, though, the brightnesses are so different, in order to see the disk at all, you have to block out the brightness of the central star and integrate for a long time.)
- **Q1.6:** IC417 is about 2.3 kpc (2,300 pc) away. Put a star/disk system just like Beta Pictoris in IC417. What size would it be, ignoring issues of surface brightness and contrast with the star?

THE POINT OF DOING THIS: The highest resolution IR data we have is IRAC, which is ~1.2 arcseconds resolution. Will we see any disks or rings around our stars using our data?