0 – For reference.

For reference, our region is given by RA=05:29:50.0 to 05:26:31.5 (82.458333 to 81.631250 degrees), Dec=+34:08:50.6 to +34:51:05 (34.147389 to 34.851389 degrees). The center is 82.0483, 34.499389. It is 2.3 kpc away.

MY BROAD GOALS for you in doing this are to (1) develop a sense of what spatial resolution means in practice and how it changes between telescopes, e.g., WISE vs. Spitzer vs. 2MASS vs. Herschel resolution; and (2) understand what the challenges will be for us in matching across wavelengths.

Ancillary goals (e.g., you can't do this worksheet without also accomplishing these): (1) get used to working with FITS files, manipulating stretches, etc.; (2) identifying objects in and measuring distances on FITS files; (3) learn how to use Finder Chart (and other IRSA tools) and ds9 (and maybe even Skyview) as resources to be used down the road on whatever you find yourself doing next.

3 – Inspecting Point Sources

Now we are going to start to look at the individual sources in our region. We're going to do this in spades soon… but let's start small. You can use the files I left on Box from Spring assignments or grab the new ones from Summer (smallsample*) .. they're the same stars.

Q4 : The IAU-compliant names of sources are based on positions. Many of the catalogs and papers that we have list some sort of unique ID within the survey, but its 'real' name is the position-based name, which is typically included in the catalogs if not all the journal articles (the journal articles are supposed to use position-based names, but they don't always). People often assign and use internal source IDs in papers because it's easier to say "source 346" in conversations with collaborators rather than the full phone number that might look like 18033652-2423108. We will do something similar. But, why is it that IRAS sources are given as, e.g., "IRAS 18006-2422" and 2MASS sources are given as, e.g., "2MASS 18033652-2423108"?

Q5 : Here are five sources selected from the list of YSOs identified in the literature. <u>Do what you need to do to see if the source appears, and appears single, in DSS, 2MASS, WISE, and Spitzer.</u>
Hints: You are trying to decide if the same source appears at the nominal location of the source in all the bands … and is apparently circular (like other point sources in that band, and comparably sized). You will probably have to use Finder Chart sometimes and IRSA Viewer sometimes. Find the images you need. Call them up in whatever FITS viewer works for you. Decide what size images you need, and/or how much you need to zoom. You may need to change the color stretch and/or color table. Are these sources present in all available bands in J band and longer? If not, which bands have this source? Are any bands saturated? The sources start easier and get harder.
Bonus: find the name of any counterparts. *Double-bonus*: how far offset from the given position are the counterparts? (By the way, you don't need to calculate this by hand…this is one of the columns returned by Finder Chart, so you literally can just use these numbers.) Here is the list of sources. You can find these by hand, or, to make it easier, there is a regions file and an IPAC tbl file in the Box drive with these 5 positions (and labels).
1. 05:27:43.28 +34:31:56.5
2. 05:28:35.79 +34:24:31.9
3. 05:28:57.47 +34:23:18.1
4. 05:28:58.49 +34:23:10.2
5. 05:28:45.74 +34:23:51.5

4 – Pulling it together.

Revisit the goals from above. How are you doing with these?

- develop a sense of what spatial resolution means in practice and how it changes between telescopes, e.g., WISE vs. Spitzer resolution;
- understand what the challenges will be for us in matching across wavelengths;
- learn how to use Finder Chart, IRSA Viewer, ds9;
- get used to working with FITS files, manipulating stretches, etc.;
- identifying objects in and measuring distances on FITS files.

Self-check:

1. Will we directly image disks or rings in our data?
2. How can you get access to data using Finder Chart or IRSA Viewer? When would you use one vs. the other?
3. How does the spatial resolution compare among 2MASS, WISE, Spitzer/IRAC, etc.? Which one has higher spatial resolution?
4. Is it possible that the sources seen as individual with MSX (or even WISE) will break into pieces when viewed in the optical?
5. Is there any guarantee that a single source seen even in the IRAC data is really a single object?