Lab 6

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1 IRAS Sources around KR 140

Output table from ds9 searching around $2^h20^m12.589^s$ $61°6'3.255''$ within a $15'$ rectangle filtered for IRAS sources.

RA (deg)	DEC (deg)	Main ID
02 15 39.7	+60 45 58	02156+6045
02 15 42.8	+60 53 28	02157+6053
02 16 05.1	+60 57 38	02160+6057
02 16 33.0	+60 53 29	02165+6053
02 16 50.7	+60 52 12	02168+6052
02 17 08.7	+60 58 18	02171+6058
02 17 26.0	+60 52 17	02174+6052

The IDs of these sources were then used in a VizieR query of the IRAS catalogue of Point Sources, Version 2.0 (IPAC 1986).

```
-- output format : csv
SELECT "II/125/main".IRAS,
"II/125/main".RA1950,
"II/125/main".DE1950,
"II/125/main".Fnu_12,
"II/125/main".e_Fnu_12,
"II/125/main".Fnu_25,
"II/125/main".e_Fnu_25,
"II/125/main".Fnu_60,
"II/125/main".e_Fnu_60,
"II/125/main".Fnu_100,
"II/125/main".e_Fnu_100
FROM "II/125/main"
WHERE "II/125/main".IRAS LIKE '02156+6045' OR
"II/125/main".IRAS LIKE '02157+6053' OR
"II/125/main".IRAS LIKE '02160+6057' OR
"II/125/main".IRAS LIKE '02165+6053' OR
"II/125/main".IRAS LIKE '02168+6052' OR
"II/125/main".IRAS LIKE '02171+6058' OR
"II/125/main".IRAS LIKE '02174+6052'
```

From this query the following table was created. Note the errors are whole number percentage errors (ie 25 means 25% error on the given measurement)

IRAS	$F_{\nu,12}$	$\epsilon_{F_{\nu,12}}$	$F_{\nu,25}$	$\epsilon_{F_{\nu,25}}$	$F_{\nu,60}$	$\epsilon_{F_{\nu,60}}$	$F_{\nu,100}$	$\epsilon_{F_{\nu,100}}$
"02174+6052"	0.8799	6	2.363	6	32.01	0	127.9	0
"02156+6045"	0.2729	0	0.3631	13	3.601	18	44.14	0
"02157+6053"	0.8217	16	1.309	13	21.8	16	215.1	0
"02168+6052"	2.157	24	2.179	22	32.01	0	127.9	14
"02165+6053"	0.3451	25	1.719	15	1.85	0	215.1	0
"02171+6058"	0.3587	15	1.84	6	11.61	10	63.52	17
"02160+6057"	2.403	16	2.99	20	47.37	20	215.1	16

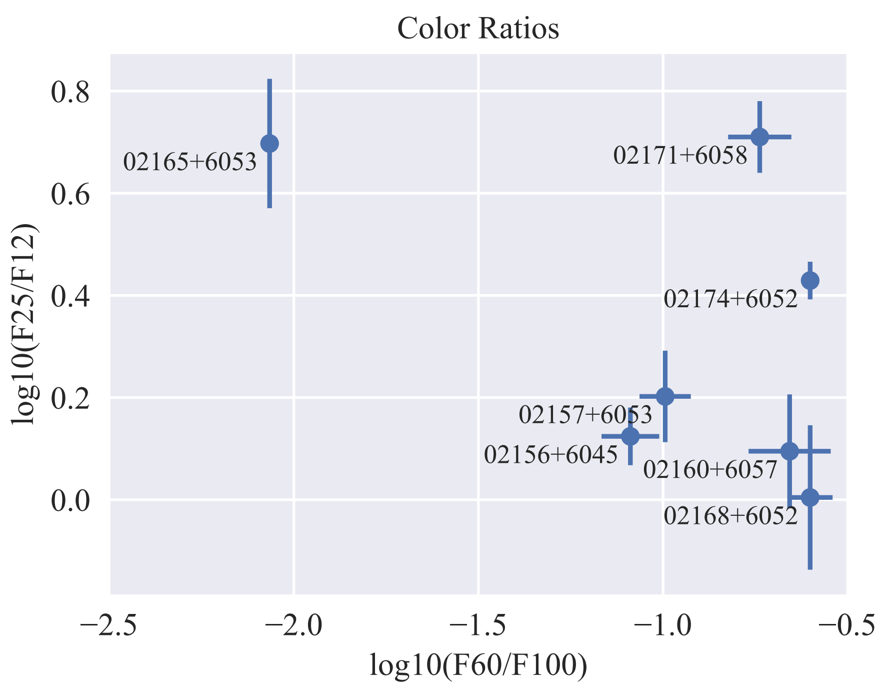
From these values I created a color plot, where

$$x = \log_{10} \frac{F_{\nu,60}}{F_{\nu,100}} \tag{1}$$

$$\sigma_x = \frac{1}{100 \ln 10} \sqrt{\epsilon^2_{F_{\nu,60}} + \epsilon^2_{F_{\nu,100}}} \tag{2}$$

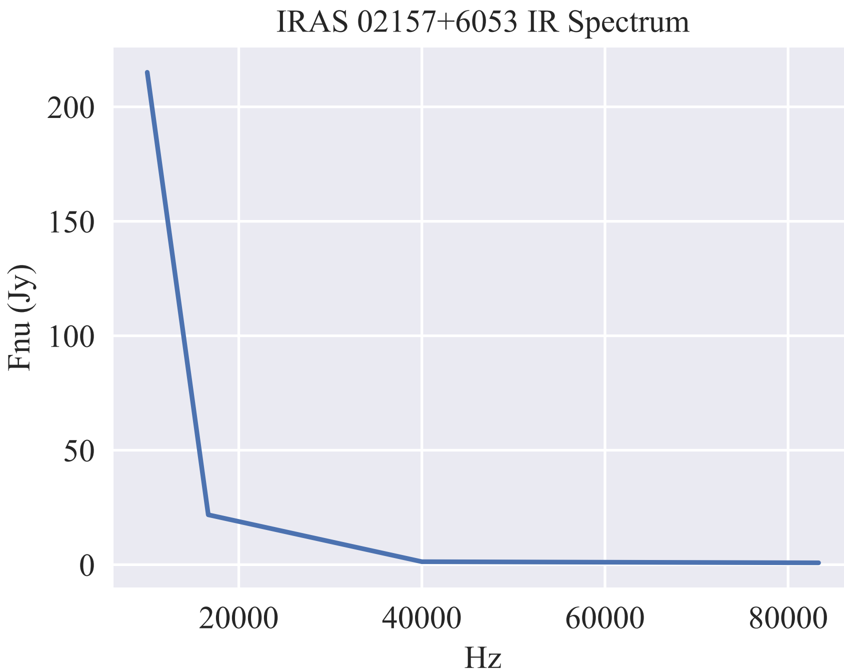
$$y = \log_{10} \frac{F_{\nu,25}}{F_{\nu,12}} \tag{3}$$

$$\sigma_y = \frac{1}{100 \ln 10} \sqrt{\epsilon^2_{F_{\nu,25}} + \epsilon^2_{F_{\nu,12}}} \tag{4}$$



I also made a spectrum plot shown in . Using this, I integrated to find the total infrared flux to be 239 jy. Using this and an assumed distance of 2.3 kpc I can estimate the integrated flux over the whole star and find its luminosity using Equation 5. The luminosity I have estimated is 7.50×10^{18} W or 1.95×10^{-8} $L_\odot$

$$L = 4\pi D^2 F \tag{5}$$



2 KR 140 in the submm

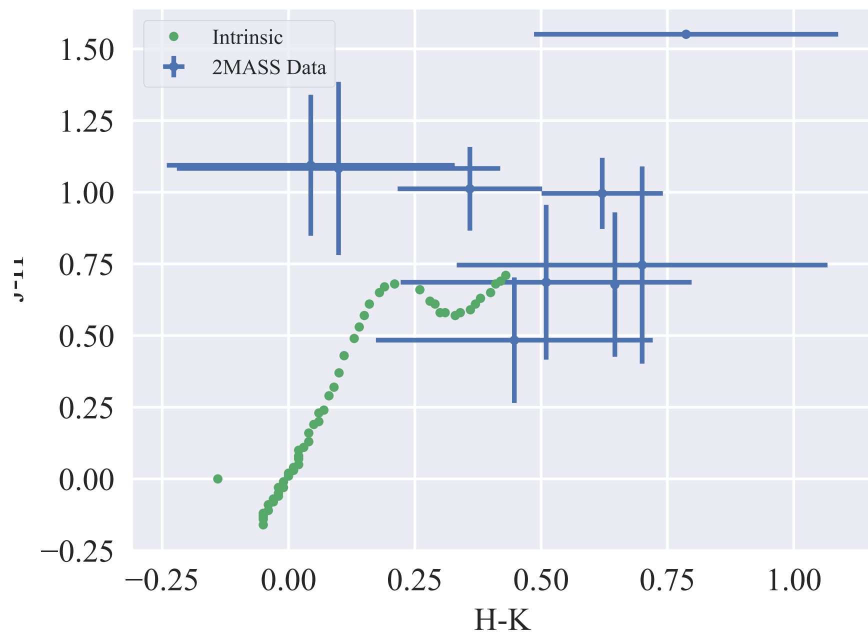
In the submm photo there is a clump around $i = +133.436, b = -0.022$ that does not correspond with any of the IRAS sources

3 A 2MASS View of an IRAS Source

From the 2MASS image server, I found a list of point sources within $1'$ of $i = +133.16, b = 0.040$ shown in section 3. Using intrinsic values from section 3, I plotted the color ratios shown in section 3.

RA	DEC	2MASS	J	ϵ_J	H	ϵ_H	K	ϵ_K
35.235414	61.062099	02205649+6103435	15.08	0.062	14.068	0.084	13.709	0.059
35.226056	61.055042	02205425+6103181	16.144	0.082	15.66	0.137	15.213	0.137
35.214326	61.057152	02205143+6103257	16.782	0.17	15.699	0.132	15.6	0.188
35.213739	61.054695	02205129+6103169	16.626	0.131	15.532	0.115	15.488	0.17
35.2113	61.057529	02205071+6103271	16.429	0.118	15.743	0.152	15.233	0.136
35.201293	61.071232	02204831+6104164	17.504		15.953	0.161	15.166	0.14
35.199207	61.069725	02204780+6104110	16.347	0.115	15.669	0.137	15.023	
35.231054	61.064381	02205545+6103517	16.801	0.151	16.055	0.193	15.355	0.174
35.22621	61.071335	02205429+6104168	15.744	0.06	14.748	0.064	14.127	0.056

Sp.	V-K	J-K	H-K	K-L	K-M
o6-8	-0.93	-0.21	-0.05	-0.04	
o9	-0.89	-0.19	-0.05	-0.03	
o9.5	-0.87	-0.18	-0.05	-0.03	
b0	-0.85	-0.17	-0.05	-0.03	
b0.5	-0.79	-0.15	-0.04	-0.02	
b1	-0.76	-0.14	-0.14	-0.02	
b2	-0.67	-0.13	-0.04	-0.02	-0.08
b3	-0.57	-0.11	-0.03	-0.02	-0.07
b4	-0.5	-0.1	-0.03	-0.02	-0.06
b5	-0.43	-0.08	-0.02	-0.01	-0.05
b6	-0.37	-0.07	-0.02	-0.01	-0.04
b7	-0.3	-0.05	-0.02	-0.01	-0.03
b8	-0.25	-0.04	-0.01	-0.01	-0.02
b9	-0.14	-0.02	-0.01	0	-0.01
a0	0	0.01	0	0	0
a1	0.06	0.02	0	0	0
a2	0.13	0.04	0.01	0	0
a3	0.2	0.05	0.01	0.01	0
a4	0.28	0.07	0.02	0.01	-0.01
a5	0.35	0.09	0.02	0.01	-0.01
a6	0.4	0.1	0.02	0.01	-0.01
a7	0.45	0.12	0.02	0.01	-0.01
a8	0.56	0.14	0.03	0.02	-0.02
a9	0.68	0.17	0.04	0.02	-0.02
f0	0.79	0.2	0.04	0.02	-0.02
f2	0.93	0.24	0.05	0.03	-0.03
f5	1.01	0.26	0.06	0.03	-0.03
f8	1.12	0.29	0.06	0.03	-0.03
g0	1.22	0.31	0.07	0.04	-0.03
g3	1.49	0.37	0.08	0.04	-0.04
g8	1.6	0.41	0.09	0.05	-0.04
k0	1.75	0.47	0.1	0.05	-0.04
k1	2	0.54	0.11	0.05	-0.04
k2	2.25	0.62	0.13	0.06	
k3	2.5	0.67	0.14	0.07	
k4	2.75	0.72	0.15	0.08	
k5	3	0.77	0.16	0.1	
m0	3.25	0.83	0.18	0.13	
m1	3.5	0.86	0.19	0.15	
m2	3.75	0.89	0.21	0.15	
m3	4	0.92	0.26	0.16	
m4	4.25	0.9	0.28	0.16	
m5	4.5	0.9	0.29	0.18	
m6	4.75	0.88	0.3		
m7	5	0.89	0.31		
m8	5.25	0.9	0.33		
	5.5	0.92	0.34		
	5.75	0.95	0.36		
	6	0.98	0.37		
	6.25	1.01	0.38		
	6.5	1.05	0.4		
	6.75	1.09	0.41		
	7	1.11	0.42		
	7.25	1.14	0.43		



4 Identifying YSOs using 2MASS Data