YSO Census in the Central Molecular Zone with JWST

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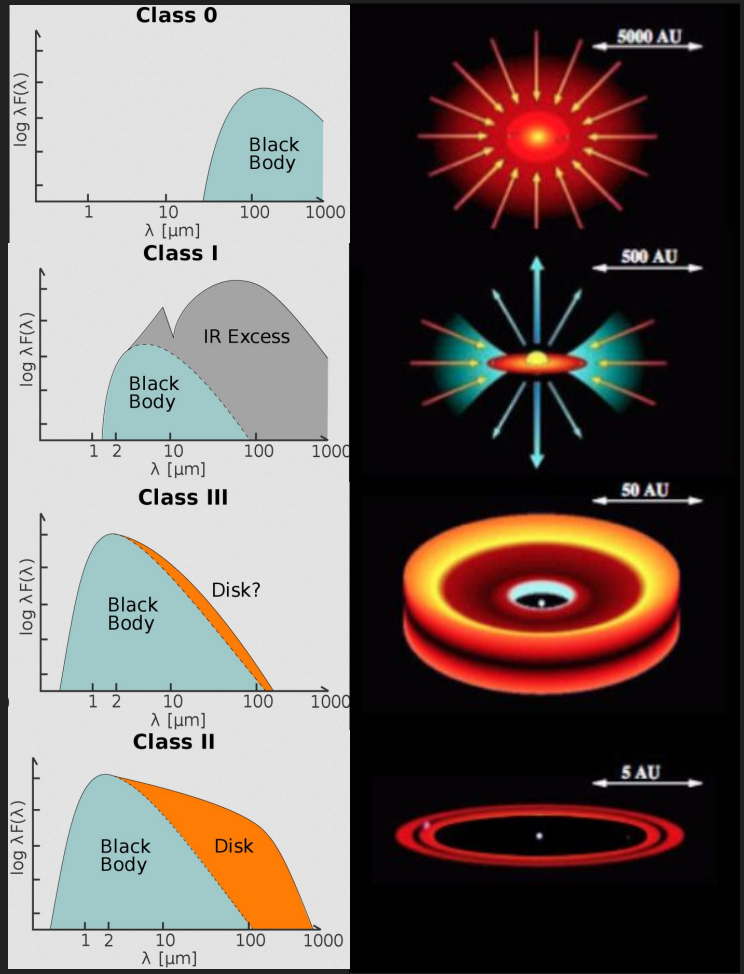
Star Formation

- Stars form in molecular clouds.
- Cloud collapse ⟹ protostellar core.
- Core continues to accrete matter.
- Infalling matter cannot fall directly into the star - angular momentum.
- Young stars are formed with Disk around them (YSO' s).
- Detection - Excess in IR.

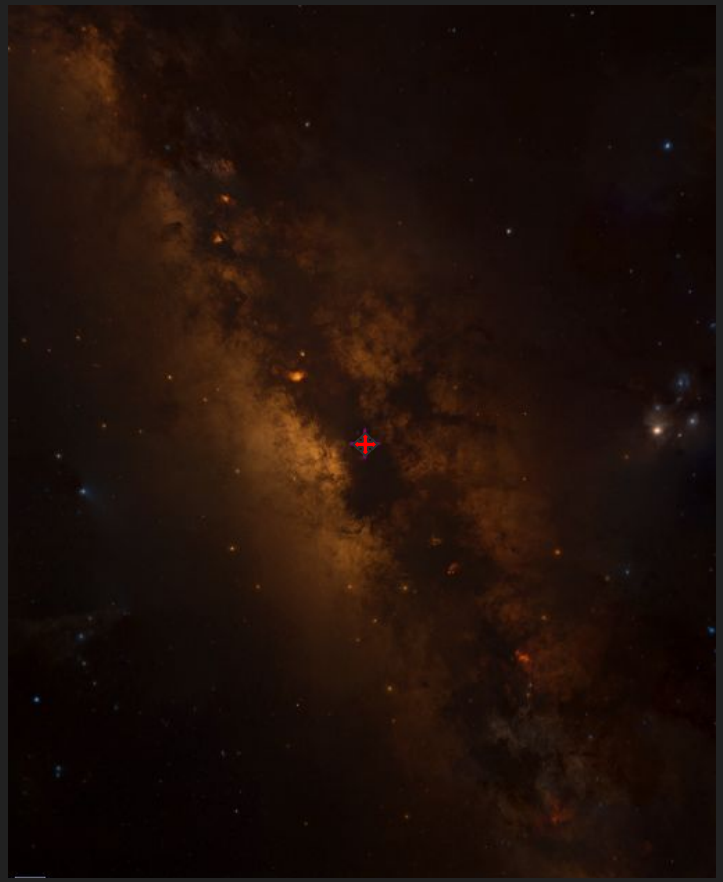


(Adam et al. 1980,Isella et al. 2006)

Central Molecular Zone (CMZ)

- Located in the CMZ (~8 kpc).
- Giant and dense molecular cloud.
- Conditions like the cosmic noon (z = 1 - 3).
- P.id : 2092

NIRCAM	MIRI
F150	F770
F210	F2100
F360	
F480	



Ref: Kauffmann et al. 2016

(DSS Image, MAST Archive)

Methodology

Stage 3 mosaics from MAST (F150,F210,F360,F480,F770)

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Photometry with PSFex and Source Extractor

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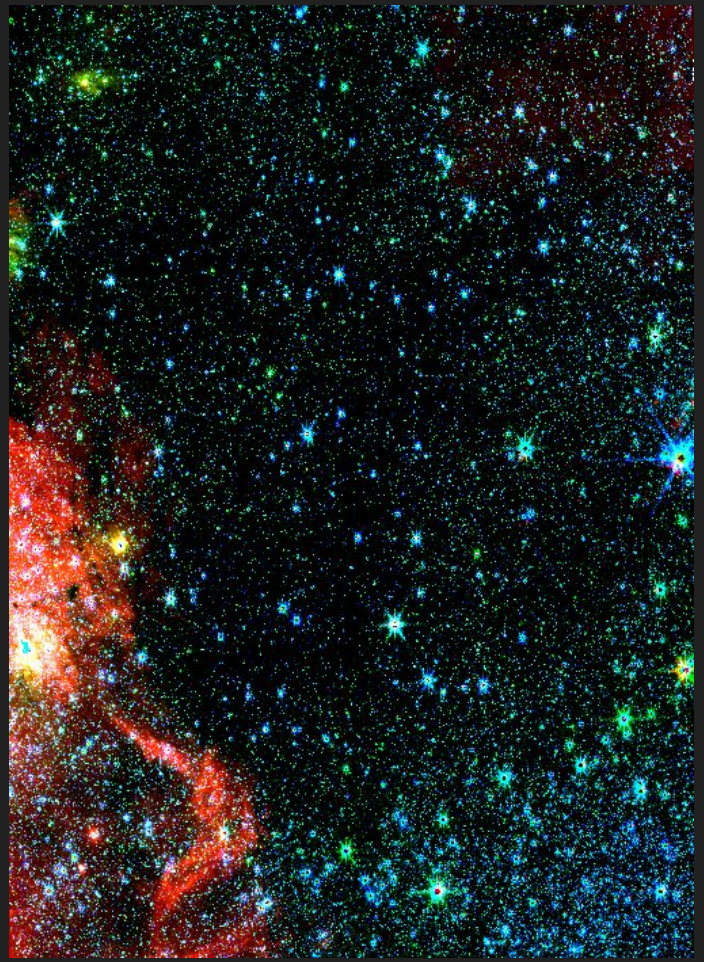
Two final Catalogues:

F150+F210+F360+F480 (NIR)

NIR+F770



How do we find the Young Stars?

Removed contaminants (e.g., foreground stars, background galaxies)

↓

Applied **Koenig et al. (2014)** classification (for 2MASS & WISE) to JWST filters

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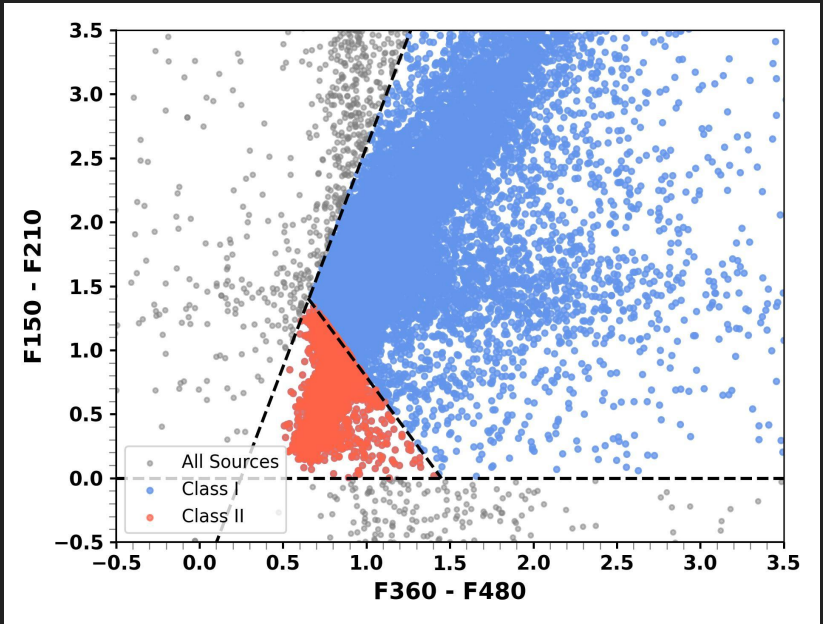
Employed two criteria (NIR and NIR+F770)

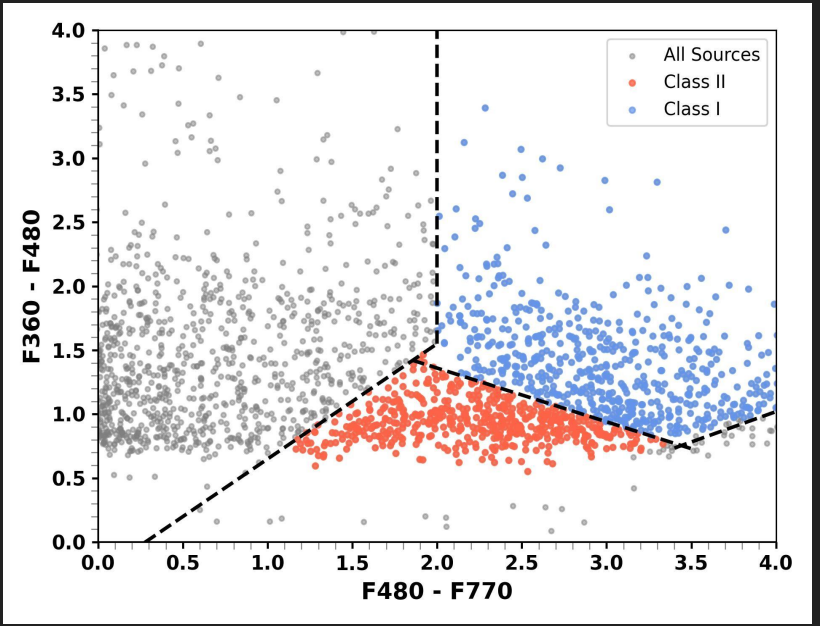
Using NIR bands

Total Sources: 27,702
Class I YSOs: **2,761**
Class II YSOs: **16,429**

Using NIR + F770

Total Sources: **4,137**
Class I YSOs: **586**
Class II YSOs: **508**





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Total Sources: 4,137
Class I YSOs: **586**
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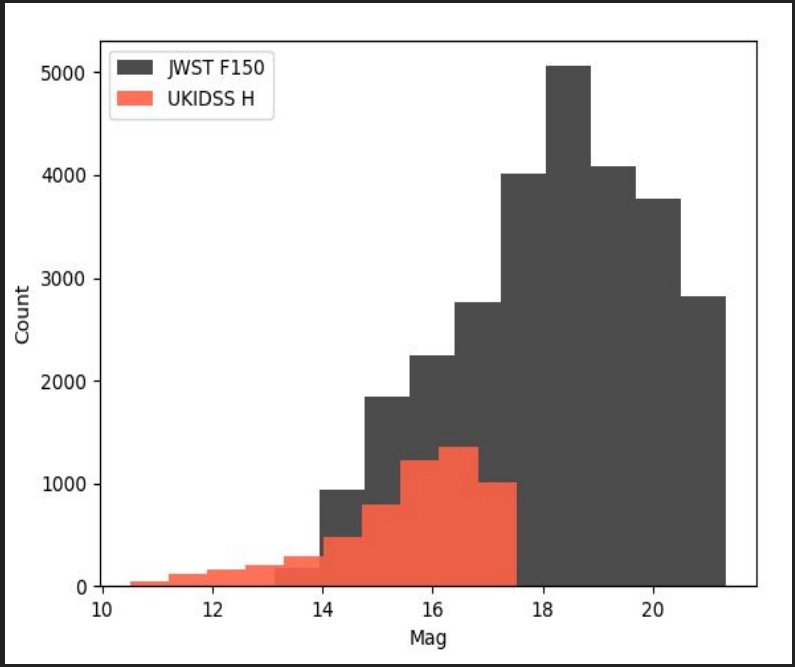
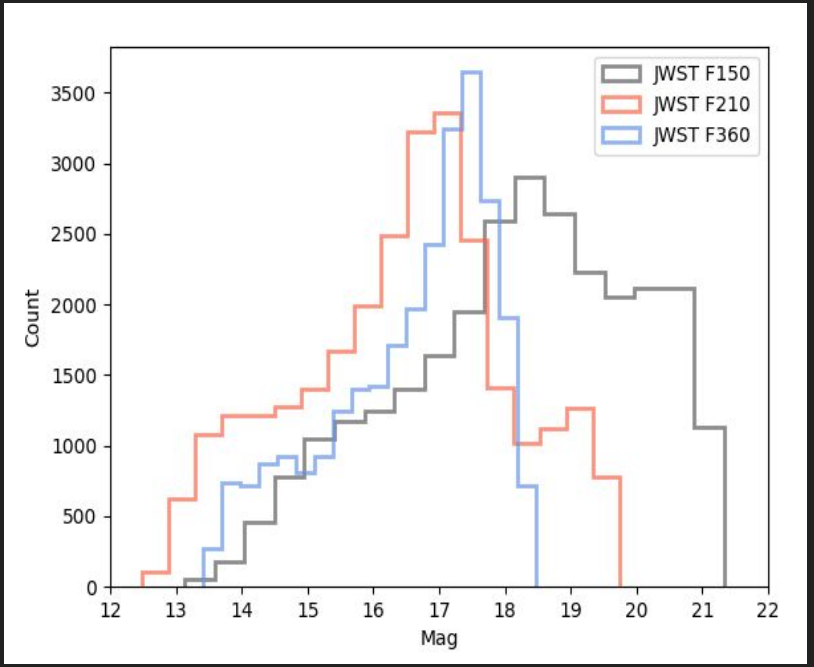
Total
Class I YSOs: 2963
Class II YSOs: 16,813

Thank You!

BACKUP


JWST F150
UKIDSS H
Count
Mag
0
1000
2000
3000
4000
5000
10
12
14
16
18
20


JWST F150
JWST F210
JWST F360
Count
Mag
0
500
1000
1500
2000
2500
3000
3500
12
13
14
15
16
17
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21
22