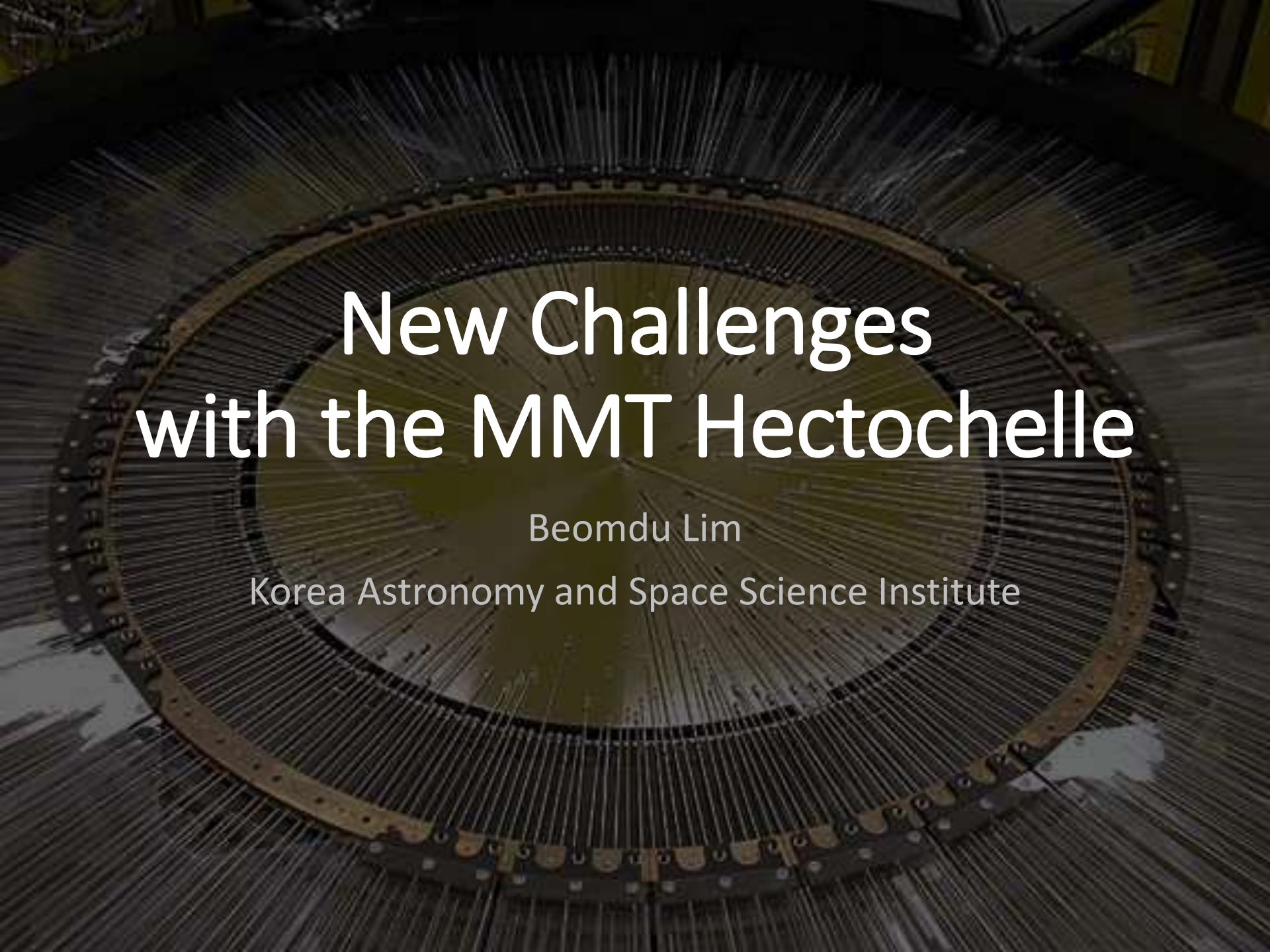


New Challenges with the MMT Hectochelle

Beomdu Lim

Korea Astronomy and Space Science Institute

Science topics

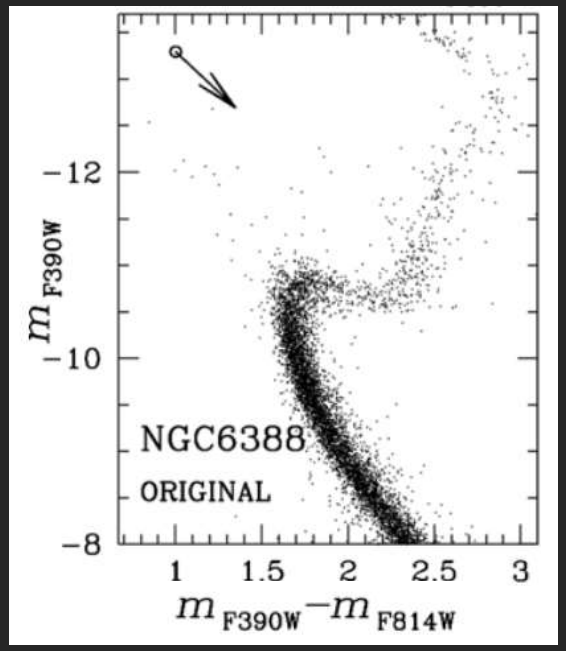
Cluster Formation Timescale
(Abundance analysis)

Feedback-Driven Star Formation
(Gas and stellar kinematics)

Cluster Formation Timescale

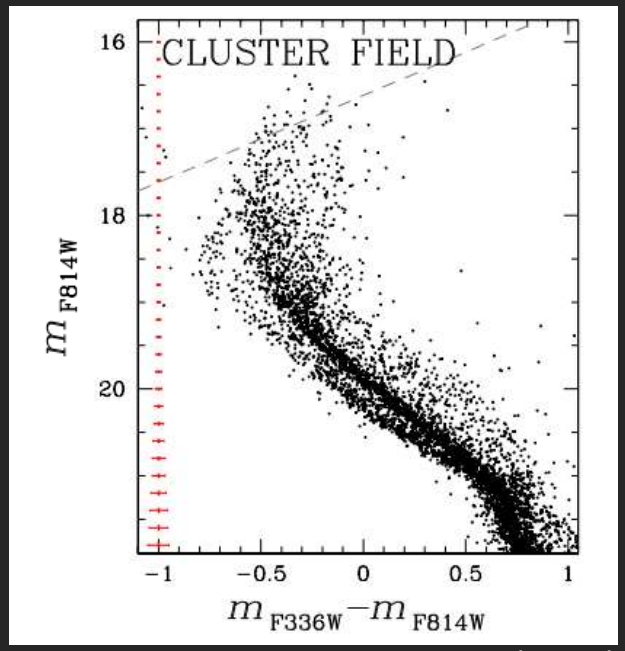
(Abundance analysis)

NGC 6388 – 13 Gyr



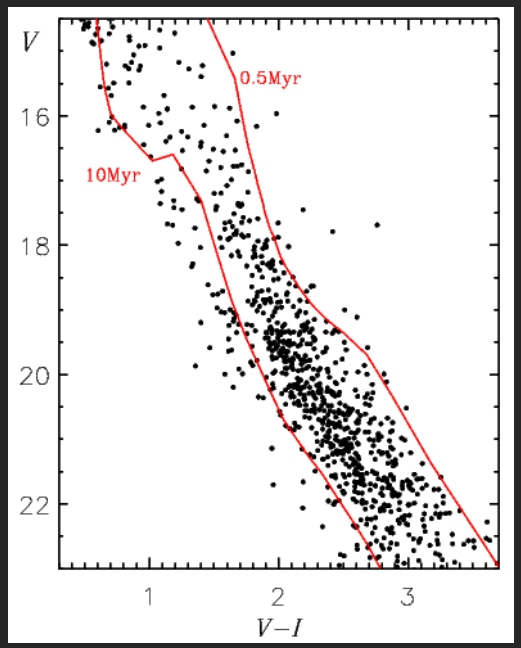
Piotto et al. (2012)

NGC 1866 – 200 Myr



Milone et al. (2017)

NGC 1893 – 2 Myr



Lim et al. (2014)

How long does it take to form star clusters?

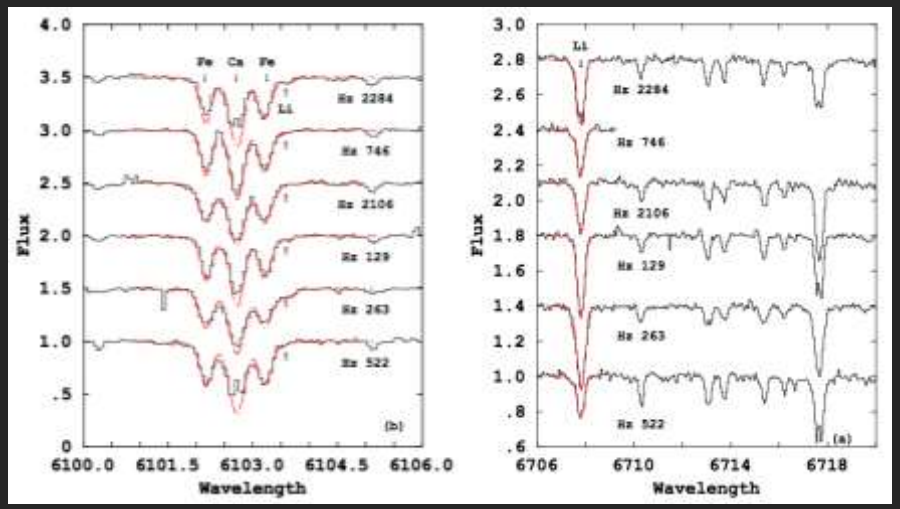
Are associations and bound clusters formed on a different timescale?

Lithium

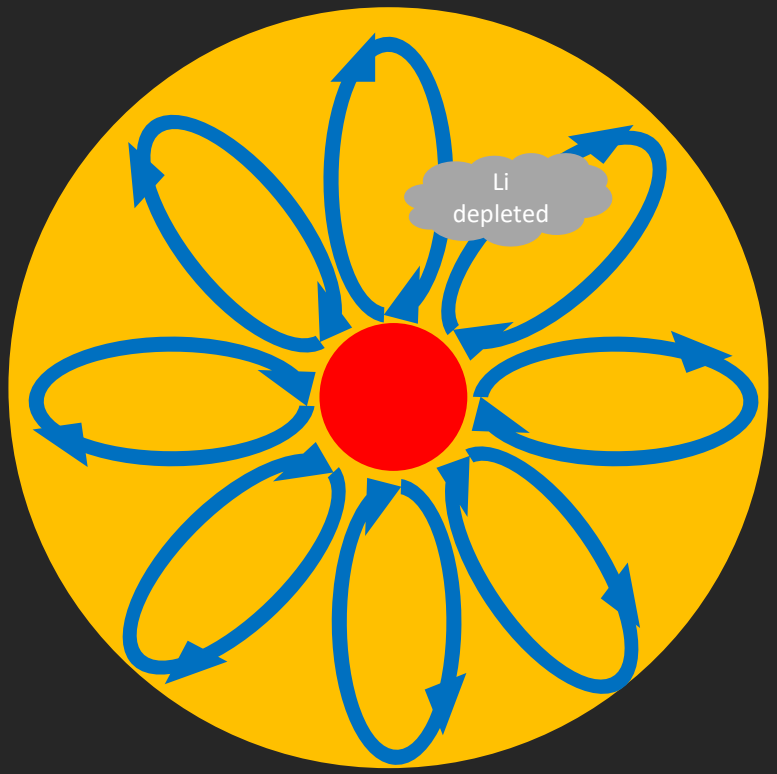
Destruction Temperature

~ 2.5 x 10^6 K

Relative age indicator



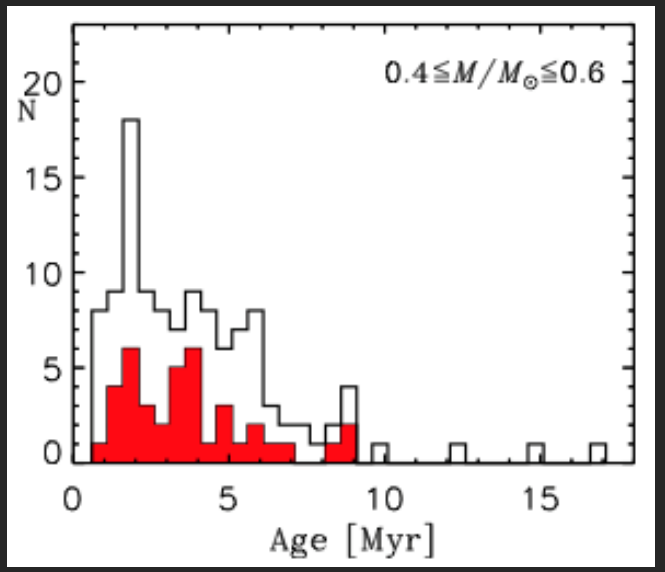
Ford et al. (2002)

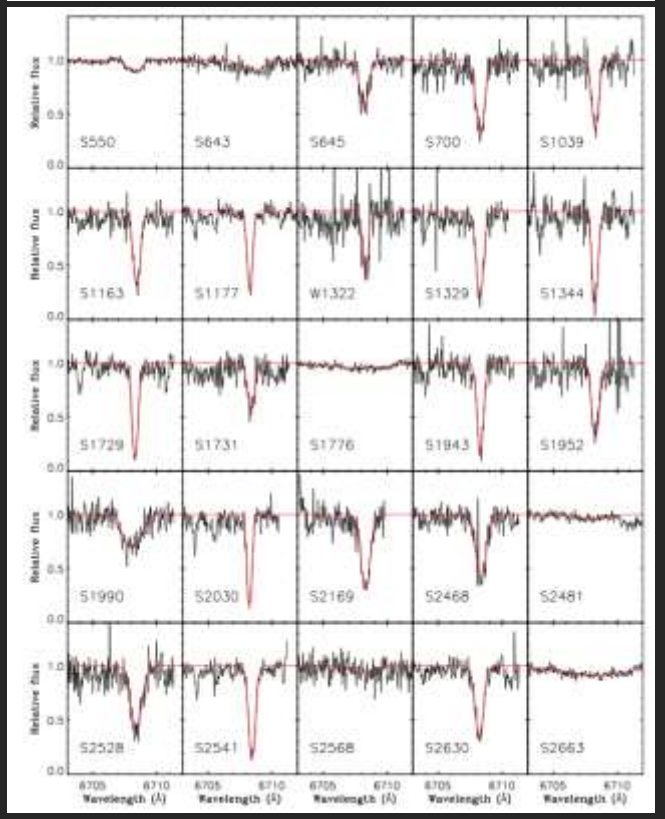


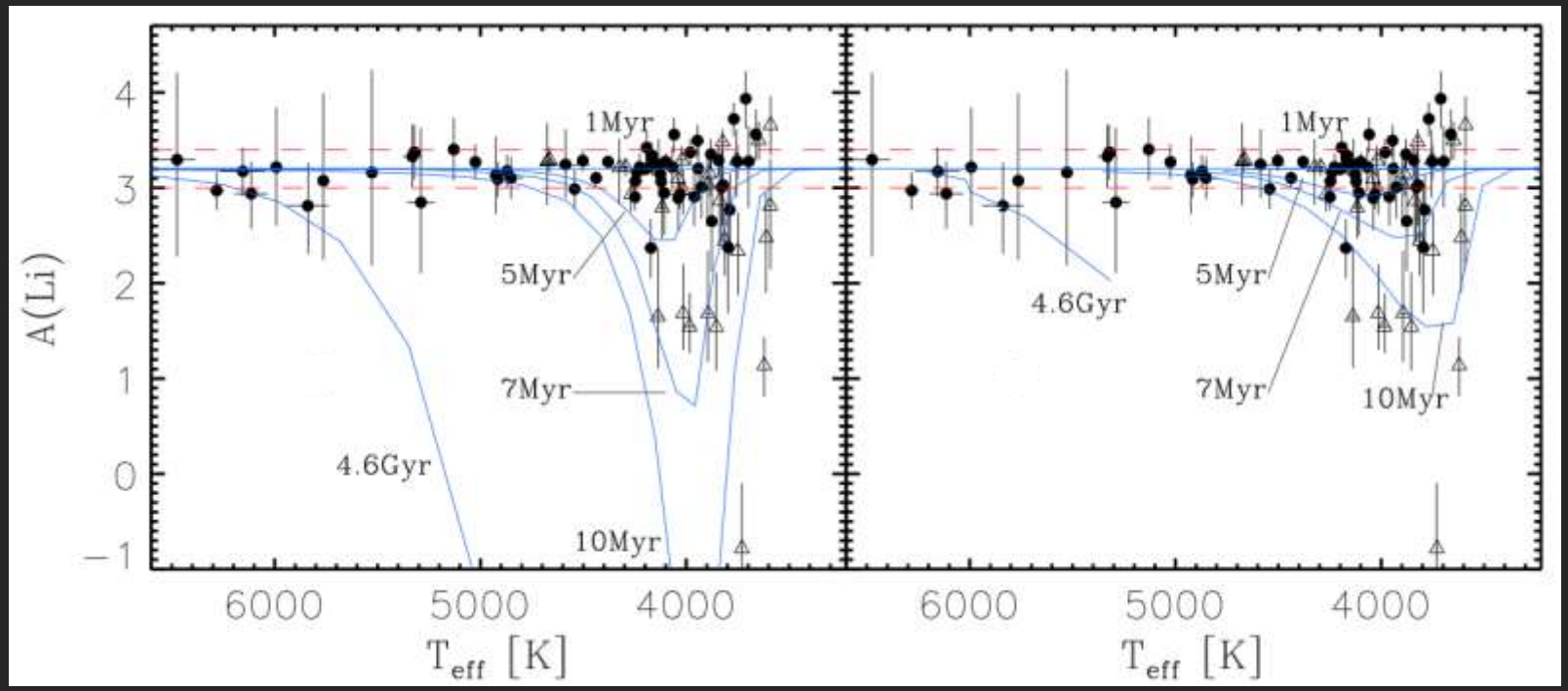
NGC 2264

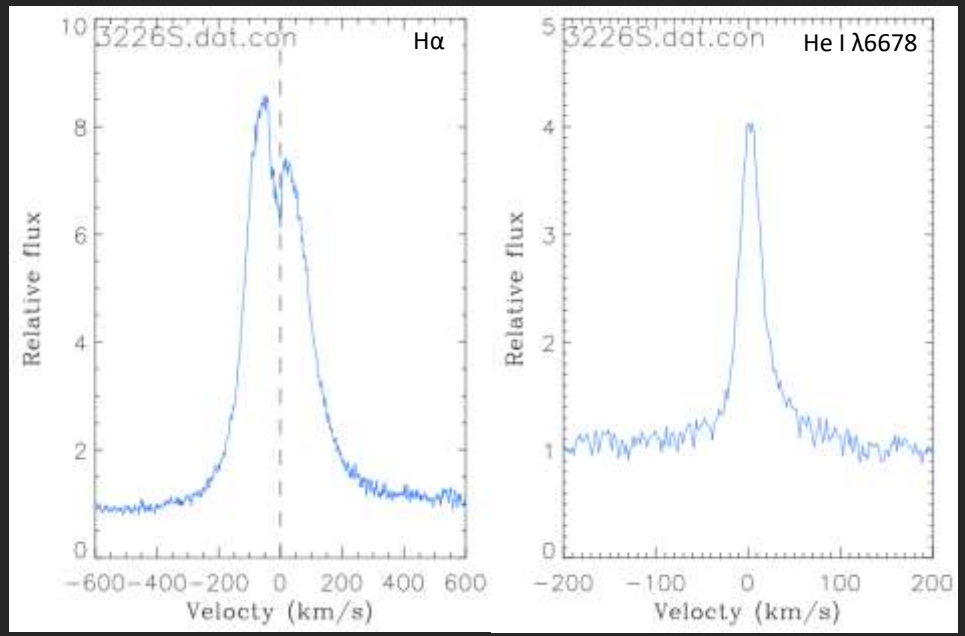
Hectochelle (OB26 filter)

Curve of growth analysis



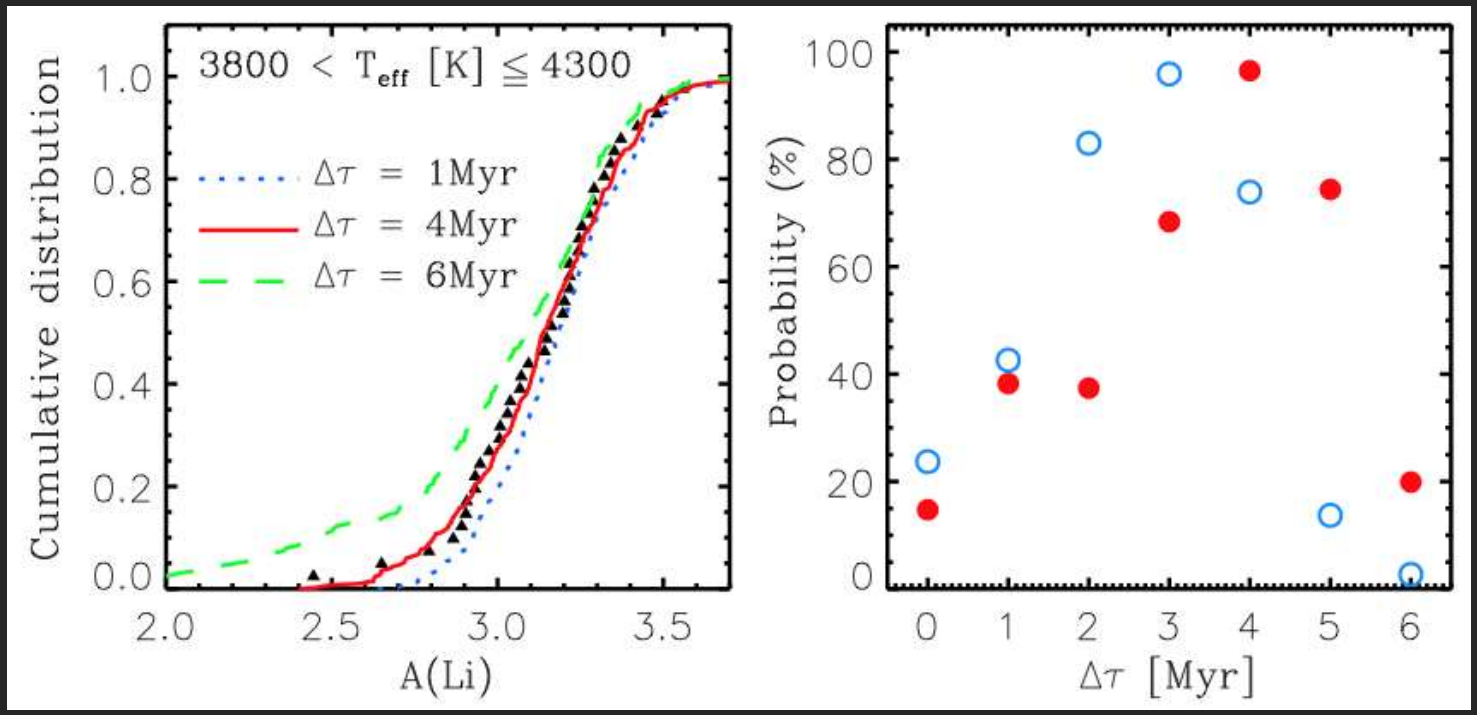






Veiling effect

Very young stars



Conclusion

NGC 2264 formed on a timescale of 3-4 Myr

Timeline

Observations	Data reduction	Analysis	Writing	Submit	Accepted	Published
04 2015	11 12	2 2016	5	7	8 9	11

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doi:10.3847/0004-637X/831/2/116

CrossMark

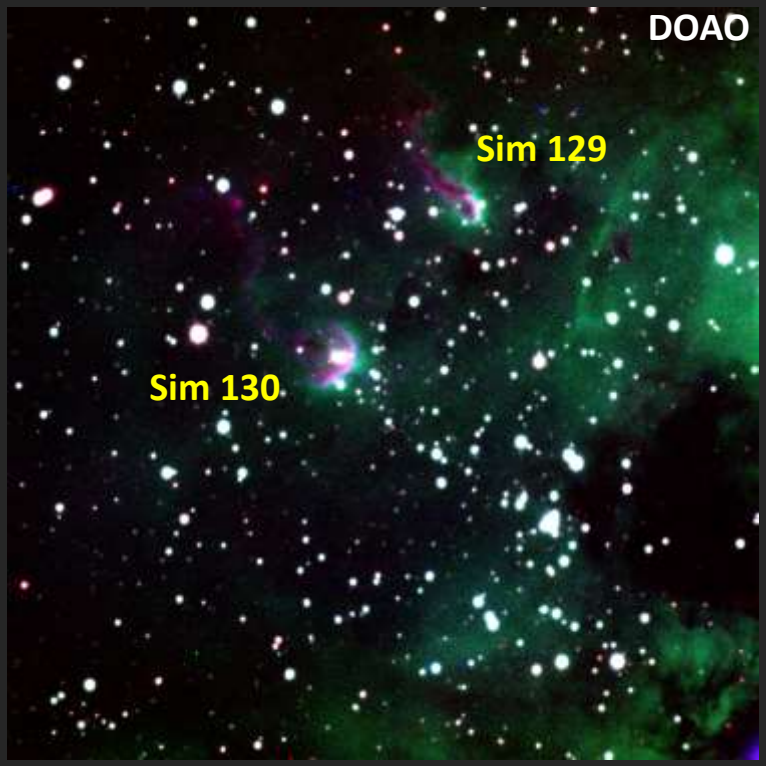
A CONSTRAINT ON THE FORMATION TIMESCALE OF THE YOUNG OPEN CLUSTER NGC 2264: LITHIUM ABUNDANCE OF PRE-MAIN SEQUENCE STARS

BEOMDU LIM[1], HWANKYUNG SUNG[2], JINYOUNG S. KIM[3], MICHAEL S. BESSELL[4], NARAE HWANG[1], AND BYEONG-GON PARK[1,5]
[1] Korea Astronomy and Space Science Institute, 776 Daedeokdae-ro, Yuseong-gu, Daejeon 34055, Korea; bdlim1210@kasi.re.kr
[2] Department of Astronomy and Space Science, Sejong University, 209 Neungdong-ro, Gwangjin-gu, Seoul 05006, Korea
[3] Steward Observatory, University of Arizona, 933 N. Cherry Ave. Tucson, AZ 85721-0065, USA
[4] Research School of Astronomy and Astrophysics, The Australian National University, Canberra, ACT 2611, Australia
[5] Astronomy and Space Science Major, University of Science and Technology, 217 Gajeong-ro, Yuseong-gu, Daejeon 34113, Korea
Received 2016 July 24; revised 2016 August 26; accepted 2016 August 26; published 2016 November 3

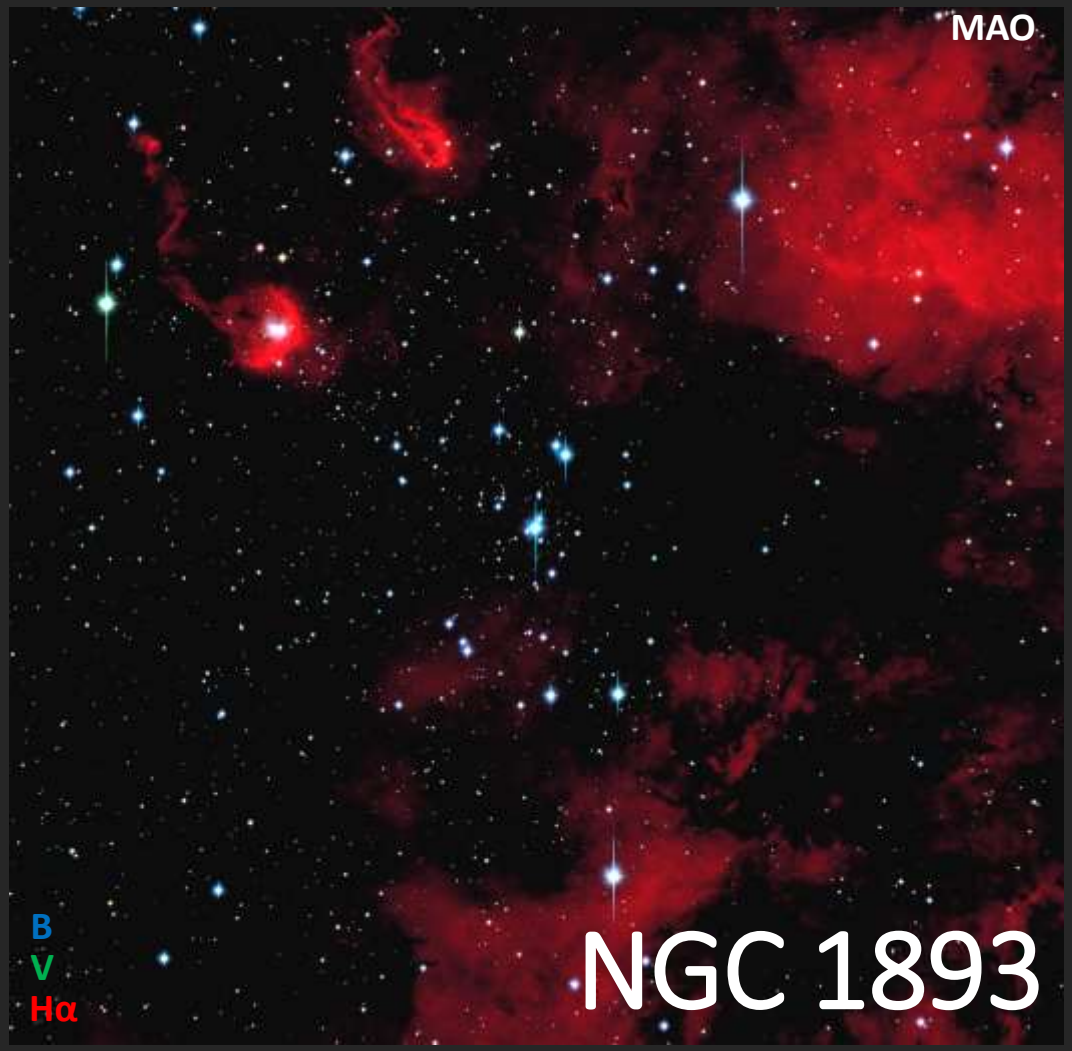
Feedback-Driven Star Formation

(Gas and stellar kinematics)

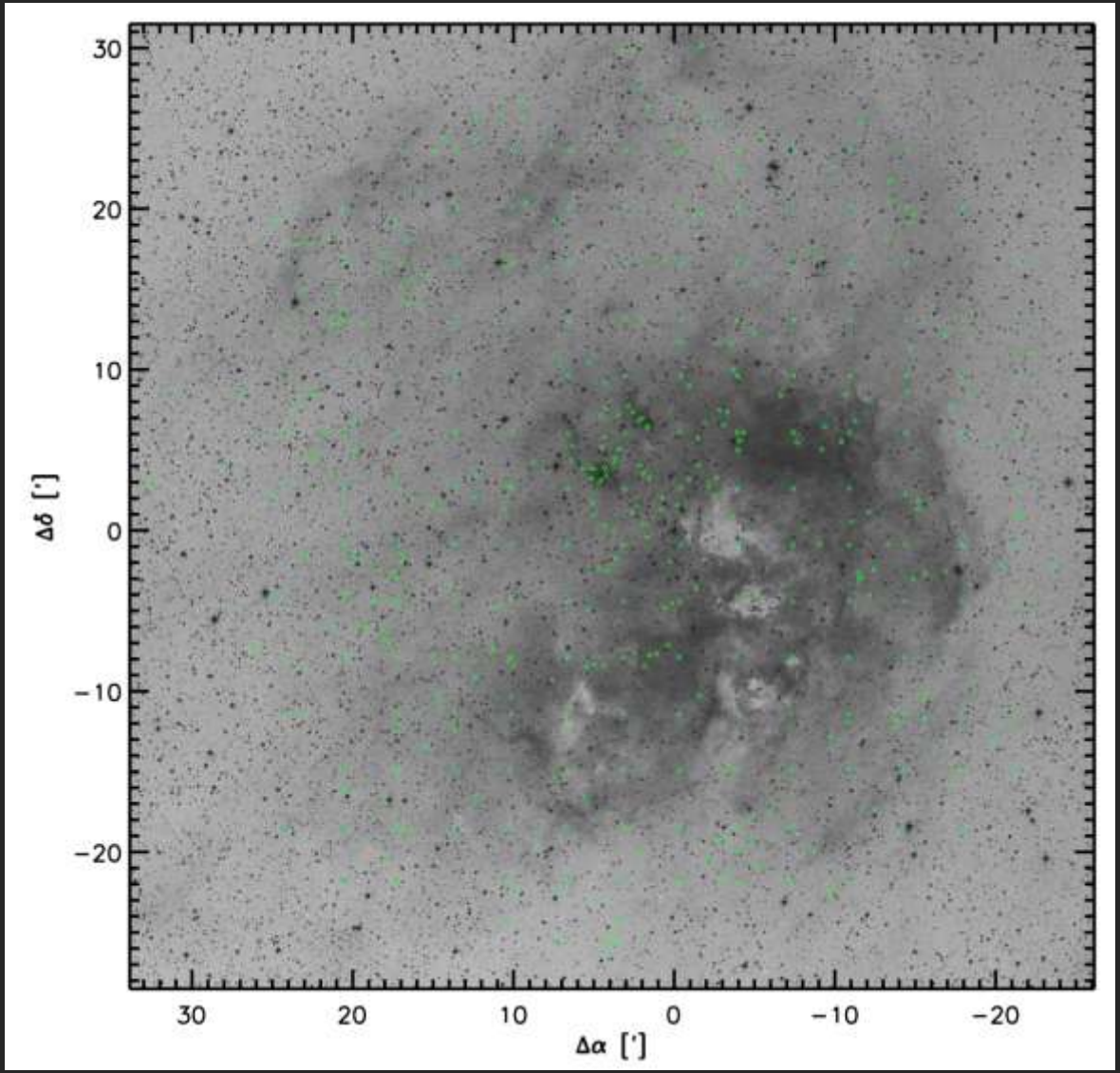
Feedback-driven star formation? Is it true?

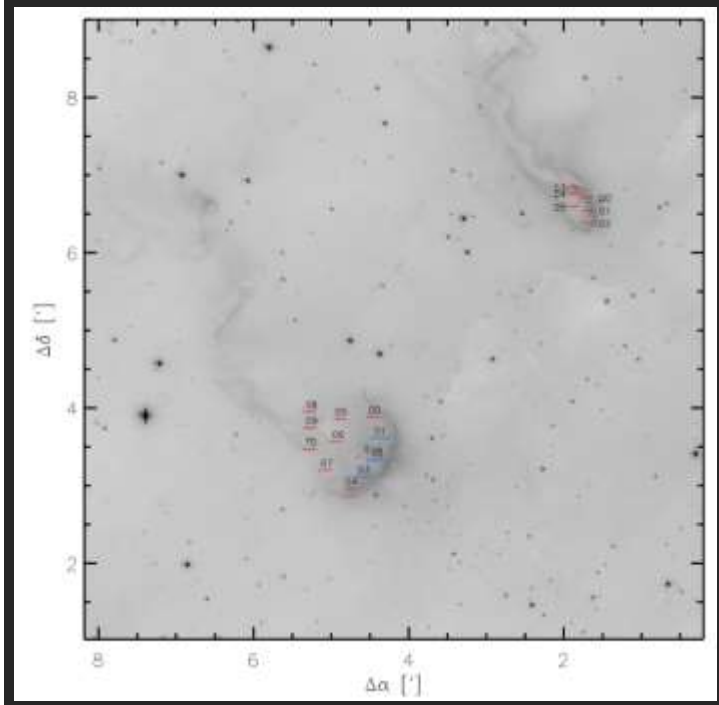


Hβ I λ6678
[O III] λ5007
[S II] λ6712



Hectochelle (OB25 and RV31 filters)





IGRINS

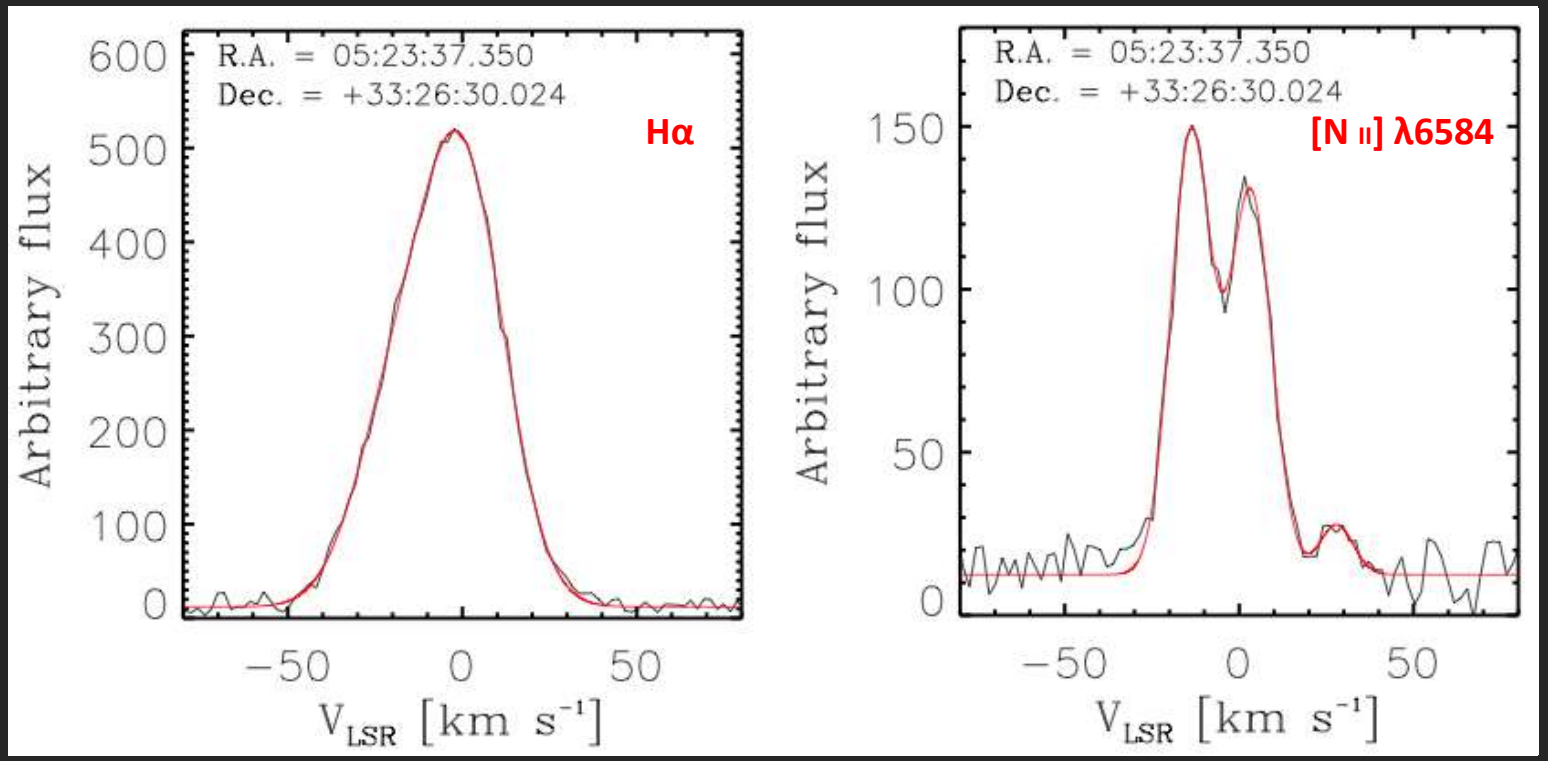
Radial Velocity

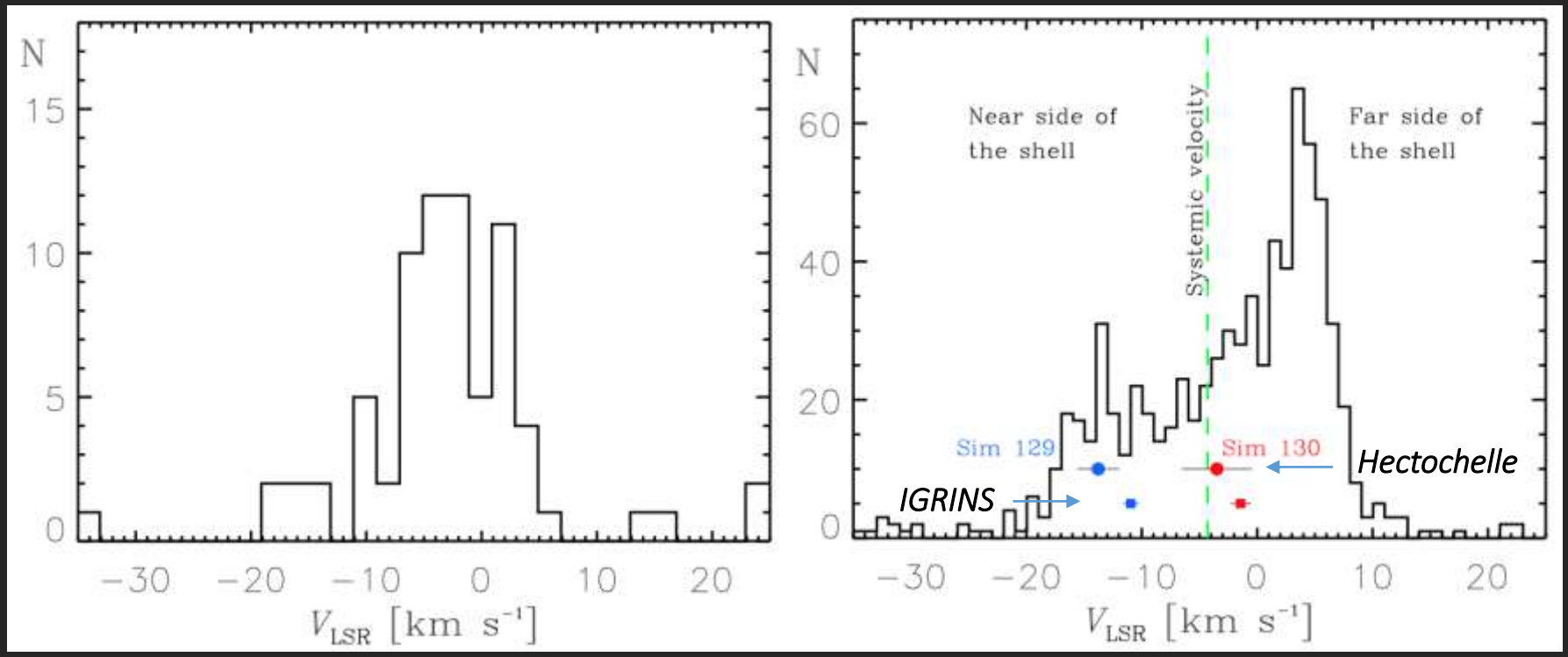
Gaussian fitting

X-correlation

Forbidden line [N II] λ6584

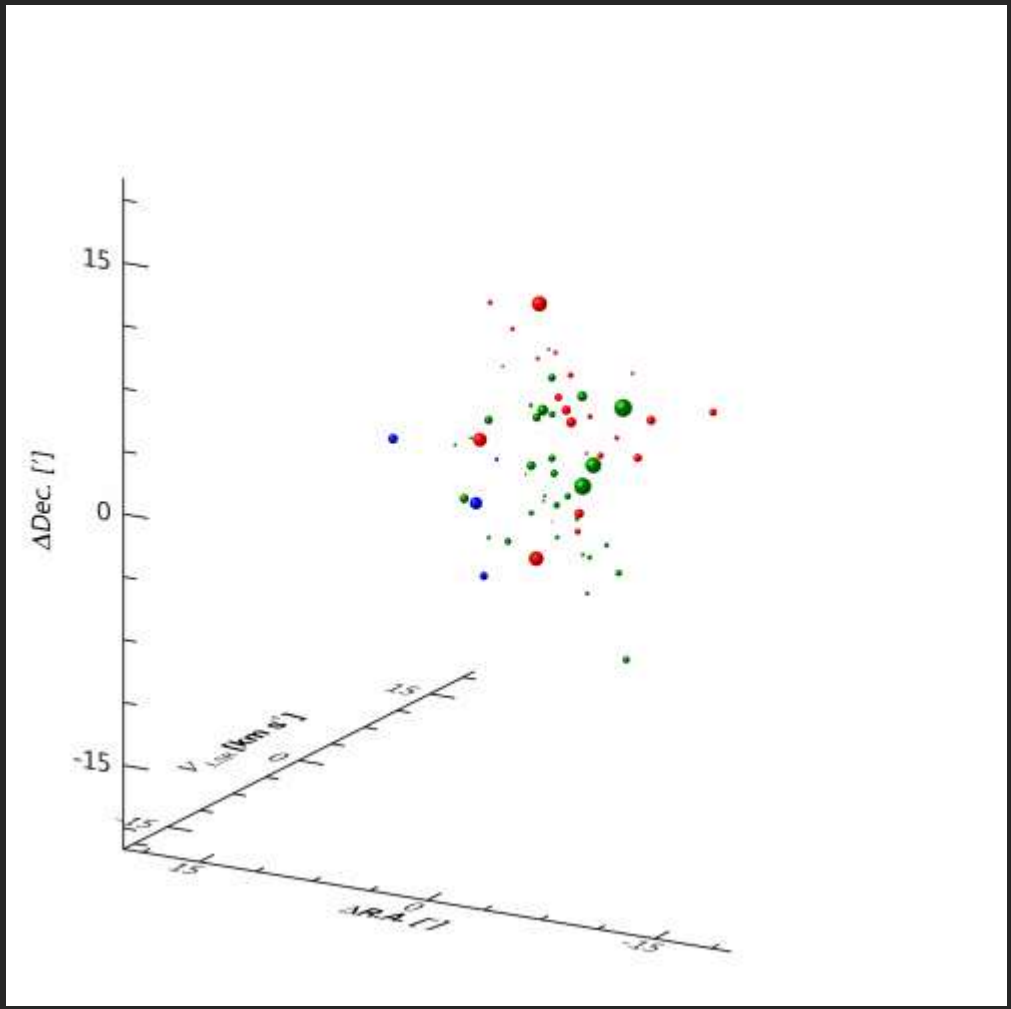
Critical density ~ 6 x 10^4 cm^{-3}

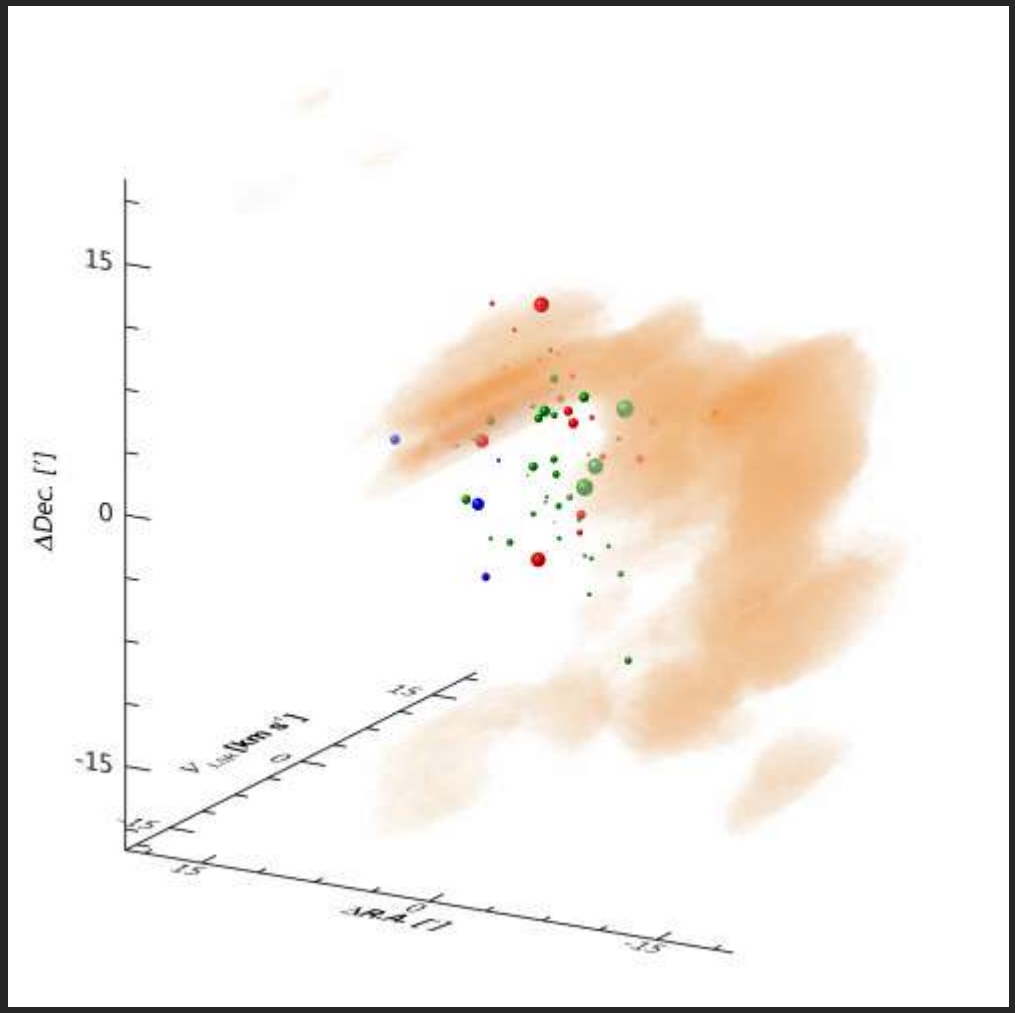


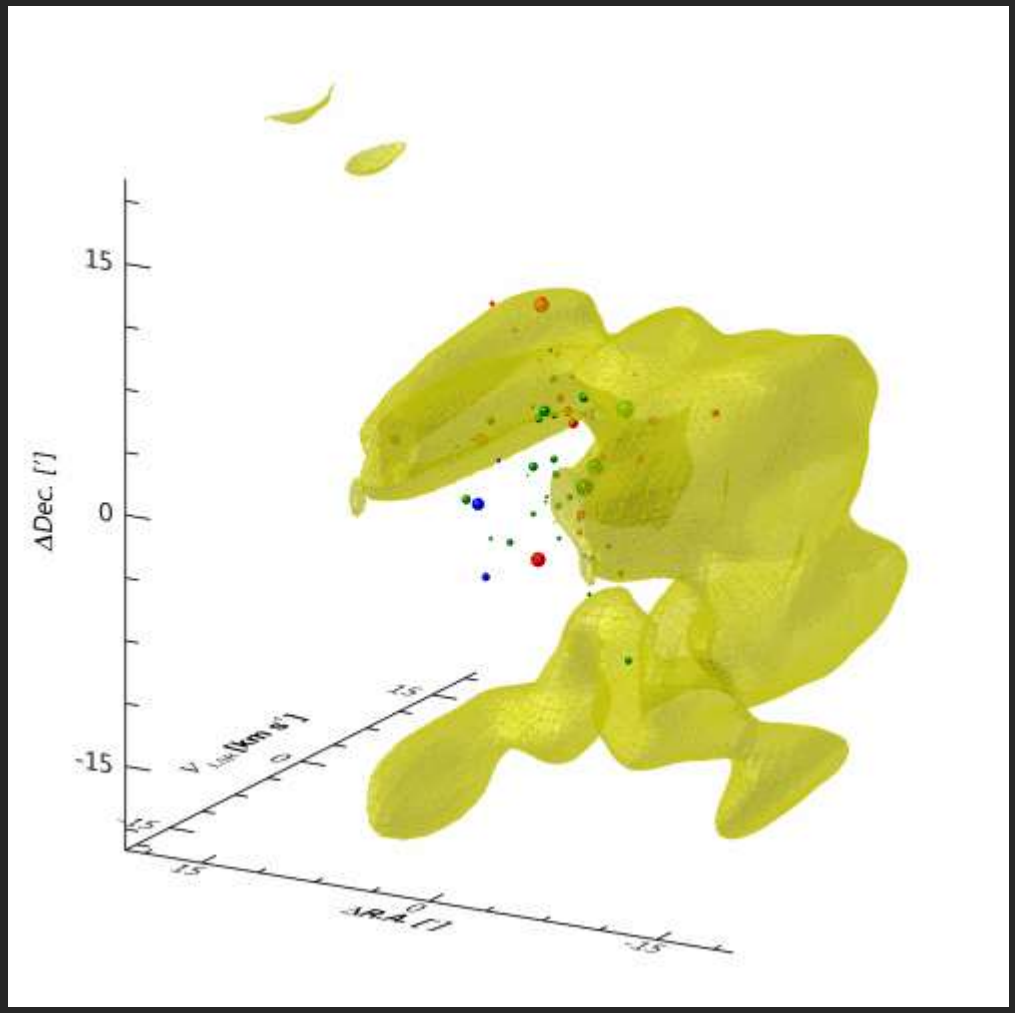


Cluster member stars

Hot and warm gas


15
0
-15
ΔDec. [']
15
0
-15
15
0
-15
ΔRA [']


15
0
-15
ΔDec. [']
15
0
-15
v_LSR [km s⁻¹]
15
0
-15
ΔR.A. [']


15
0
-15
ΔDec. [']
15
0
-15
15
0
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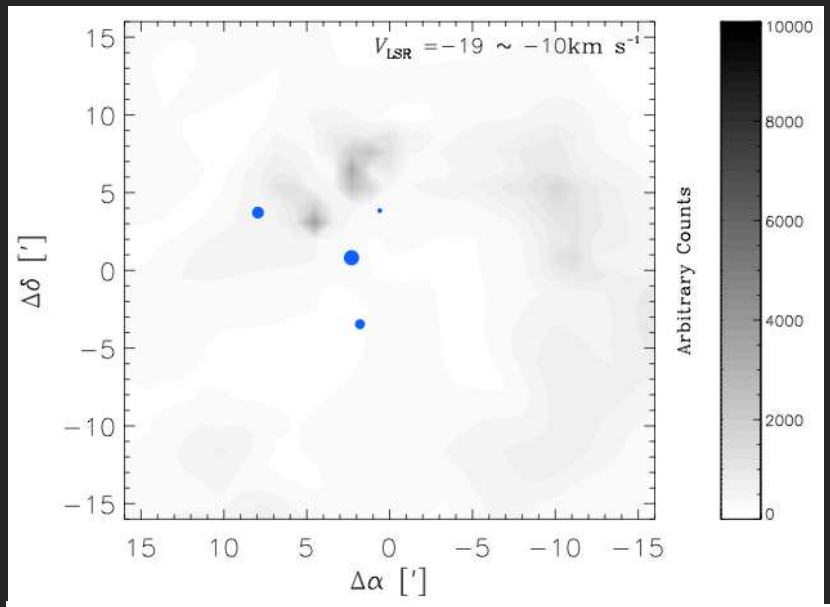
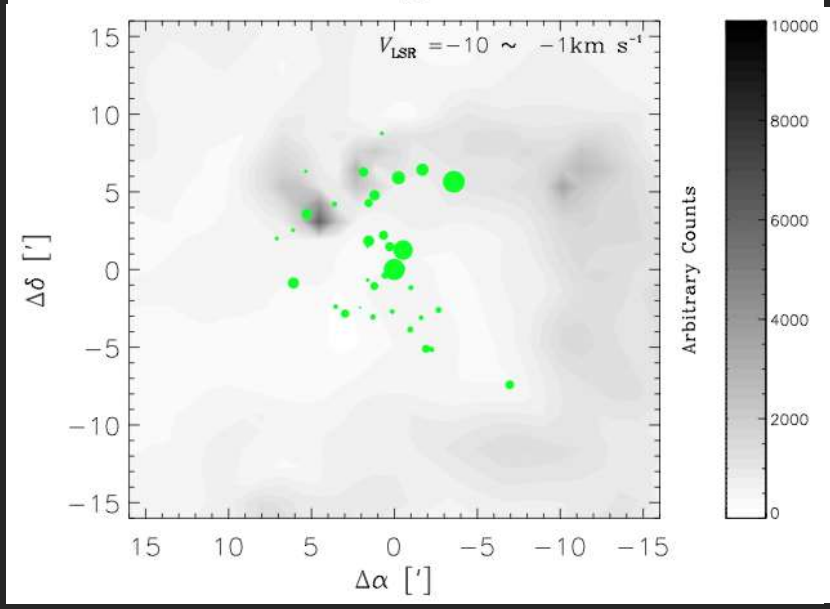
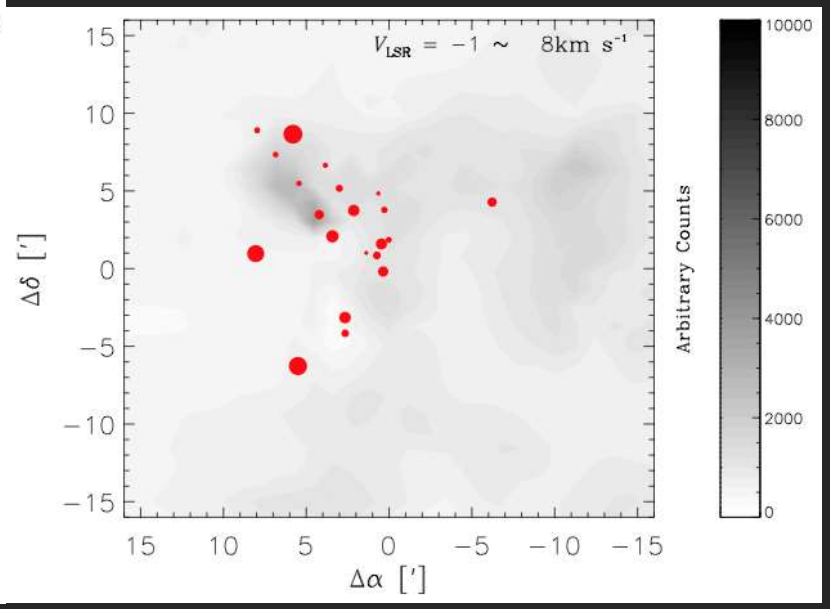
ΔRA [']


V_{LSR} = −19 ~ −10km s^{-1}
Δδ [′]
Δα [′]
Arbitrary Counts
15
10
5
0
−5
−10
−15
10000
8000
6000
4000
2000
0


V_{LSR} = −10 ~ −1km s^{-1}
Δδ [′]
Δα [′]
Arbitrary Counts
15
10
5
0
−5
−10
−15
10000
8000
6000
4000
2000
0


V_{LSR} = −1 ~ 8km s^{-1}
Δδ [′]
Δα [′]
Arbitrary Counts
15
10
5
0
−5
−10
−15
10000
8000
6000
4000
2000
0

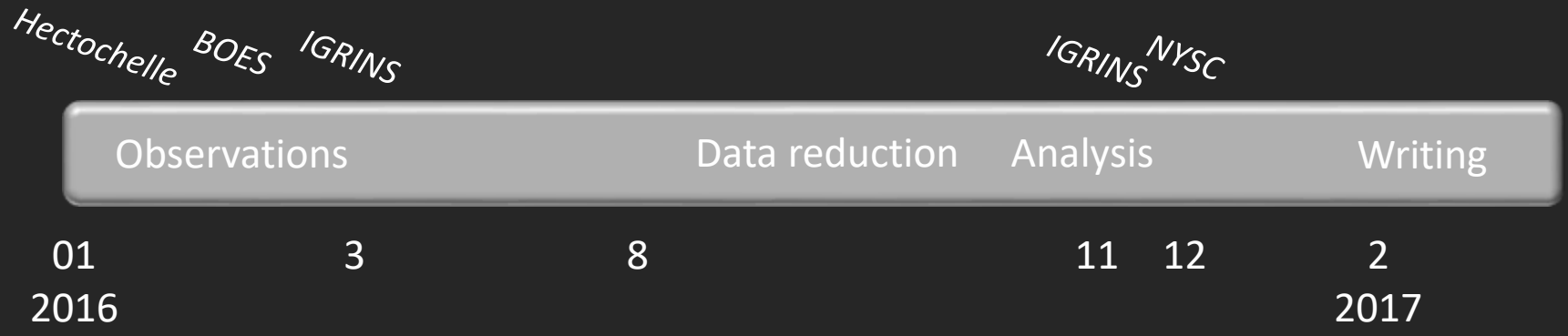
Conclusion

Feedback from massive stars can trigger the formation of new generations of stars

Implication

Massive star feedback plays a very important role in the formation of low-density OB association

Timeline


Hectochelle
BOES
IGRINS
IGRINS
NYSC
Observations
Data reduction
Analysis
Writing
01
2016
3
8
11
12
2
2017

What next?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