

# S a F a Ne Le e #348 N . 19-23

N . 19 C a a f a NGC 2264, R.J. Pa e & C.

Sc e e , MNRAS, 510, 1136 (2022)

N . 23 C a e a c d f NGC 2264 e ec ed a

f d Ga a DR2, C. Sc e e e a . MNRAS, 510, 3178 (2022)

N . 20 S 2-301: a b e ed H e de a f a , R.

Pa de e a ., A J, 926, 22 (2022)

N . 21 A e a e acc e a d a e de e e

T a -l e a e e , S.N. Ra de a . Na e A , 6, 80  
(2022)

N . 22 A e e d f ea e 3D b e e c d e f  
ec a c d , M. S e a & C. Fede a , MNRAS, 509, 5237 (2022)

N. 19 Cantafarina & NGC 2264, R.J. Parker & C. Scuderi,  
MNRAS, 510, 1136 (2022)

N. 23 Cantafarina et al. f NGC 2264  
Gaia DR2, C. Scuderi et al. MNRAS, 510, 3178 (2022)

Parker +22 Ferraro .1

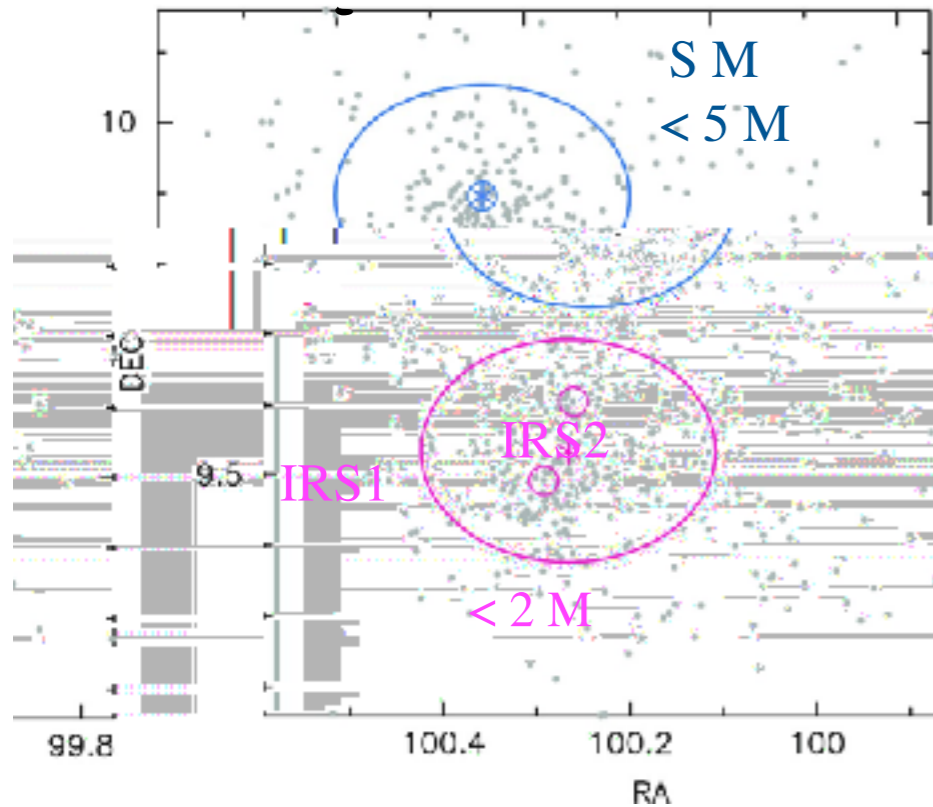
主張は共通: NGC 2264 の初期密度は  $\rho \sim 10^4 M_{\odot} \text{pc}^{-3}$  で高かった

近接遭遇により円盤を力学的に壊わしただろう

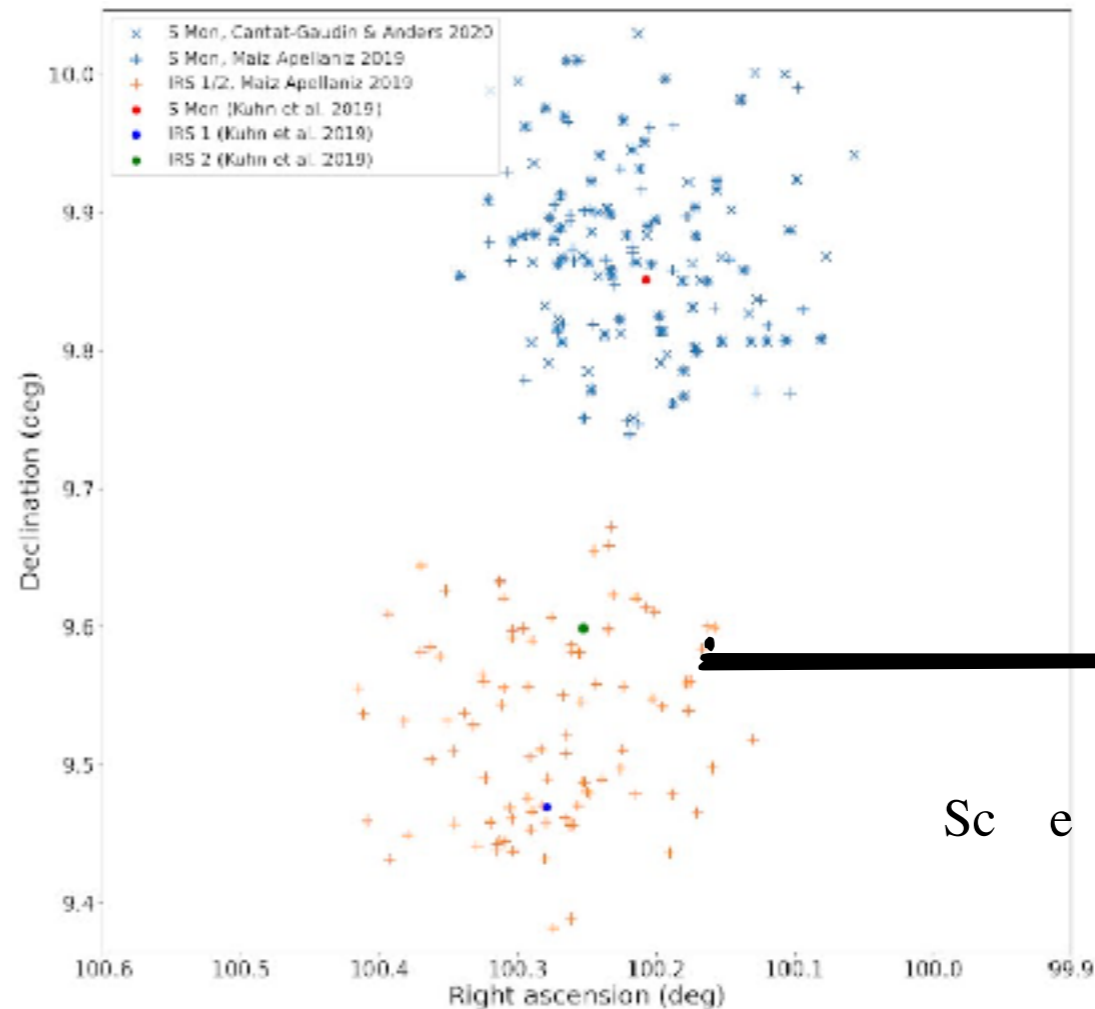
Scuderi +21: Gaia によるデータ解析+Rada & Watters の頻度

Parker & Scuderi 21: C 型の b 成分が残っているから

解析方法は ONC で成功したもの



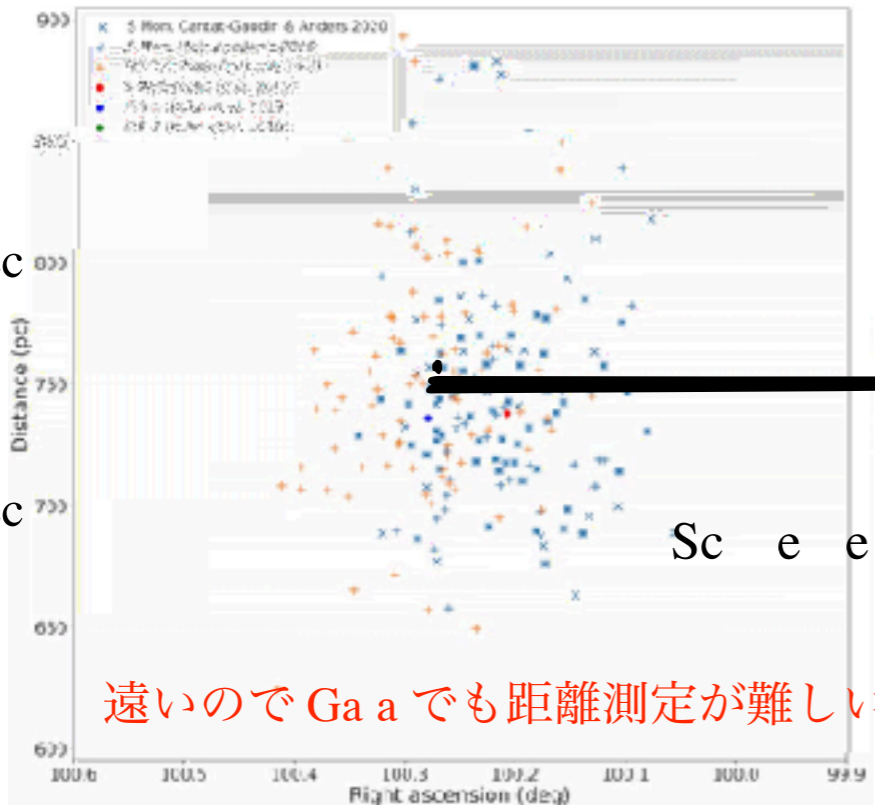
Gaia DR2 での解析の再検討



Scuderi +21 Ferraro .1

1250  $\mu$  a c e c

1429  $\mu$  a c e c



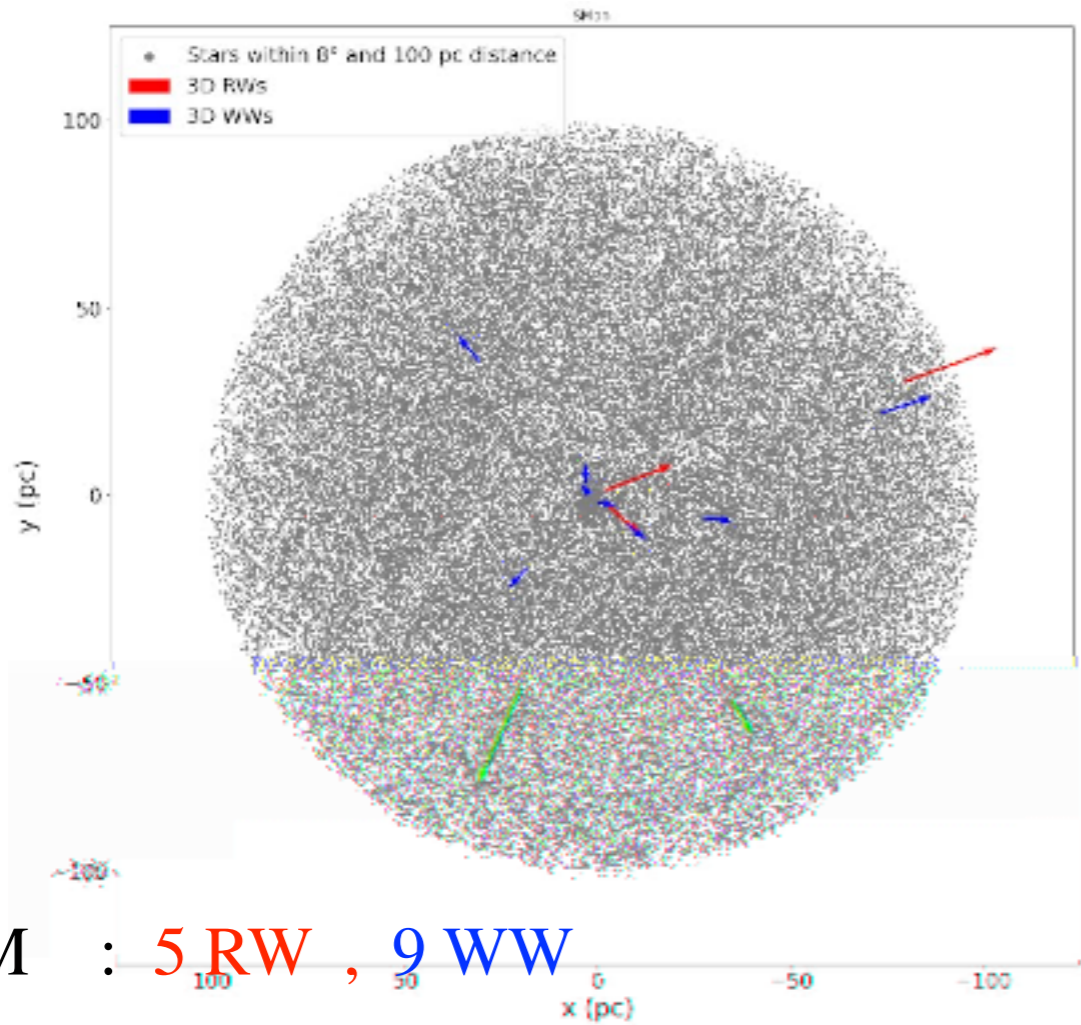
R a a : > 30     -1 RW  
 Wa a a : ~ 5     -1 WW

10     -1 = 2.6     a     -1 @800 c

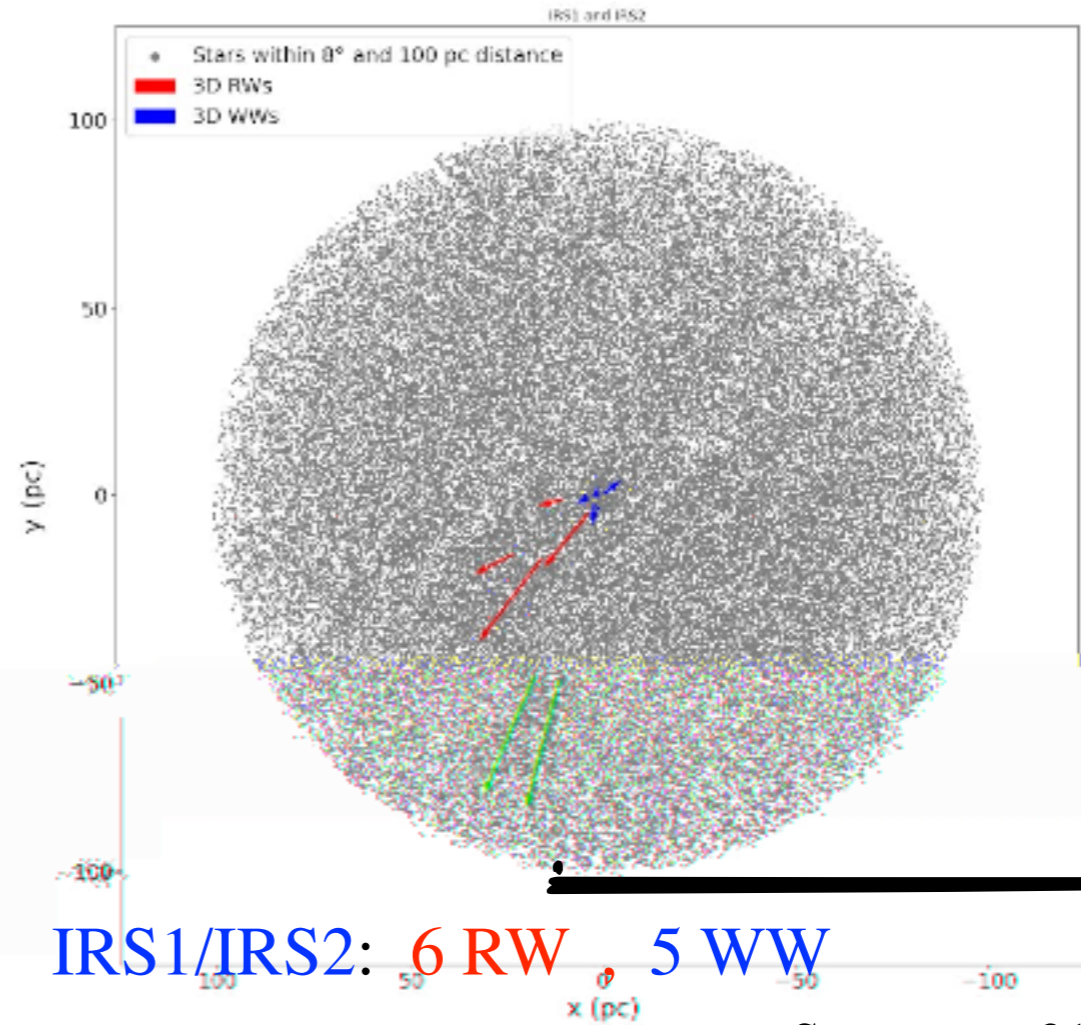
Ga a EDR3     様々な補正

Sc e e +21 F .1

遠いので Ga a でも距離測定が難しい

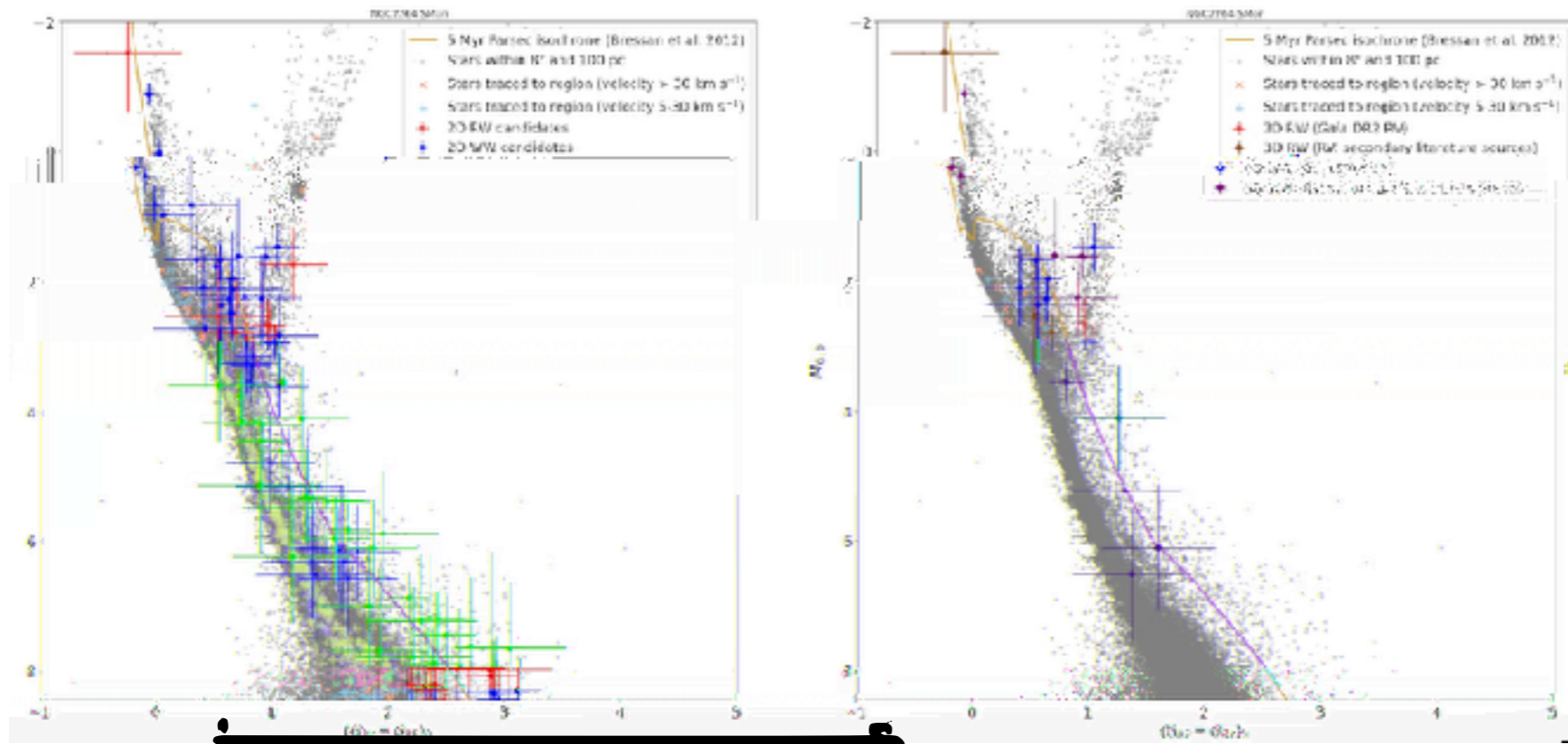


S M : 5 RW , 9 WW



IRS1/IRS2: 6 RW , 5 WW

Sc e e +21 F .6

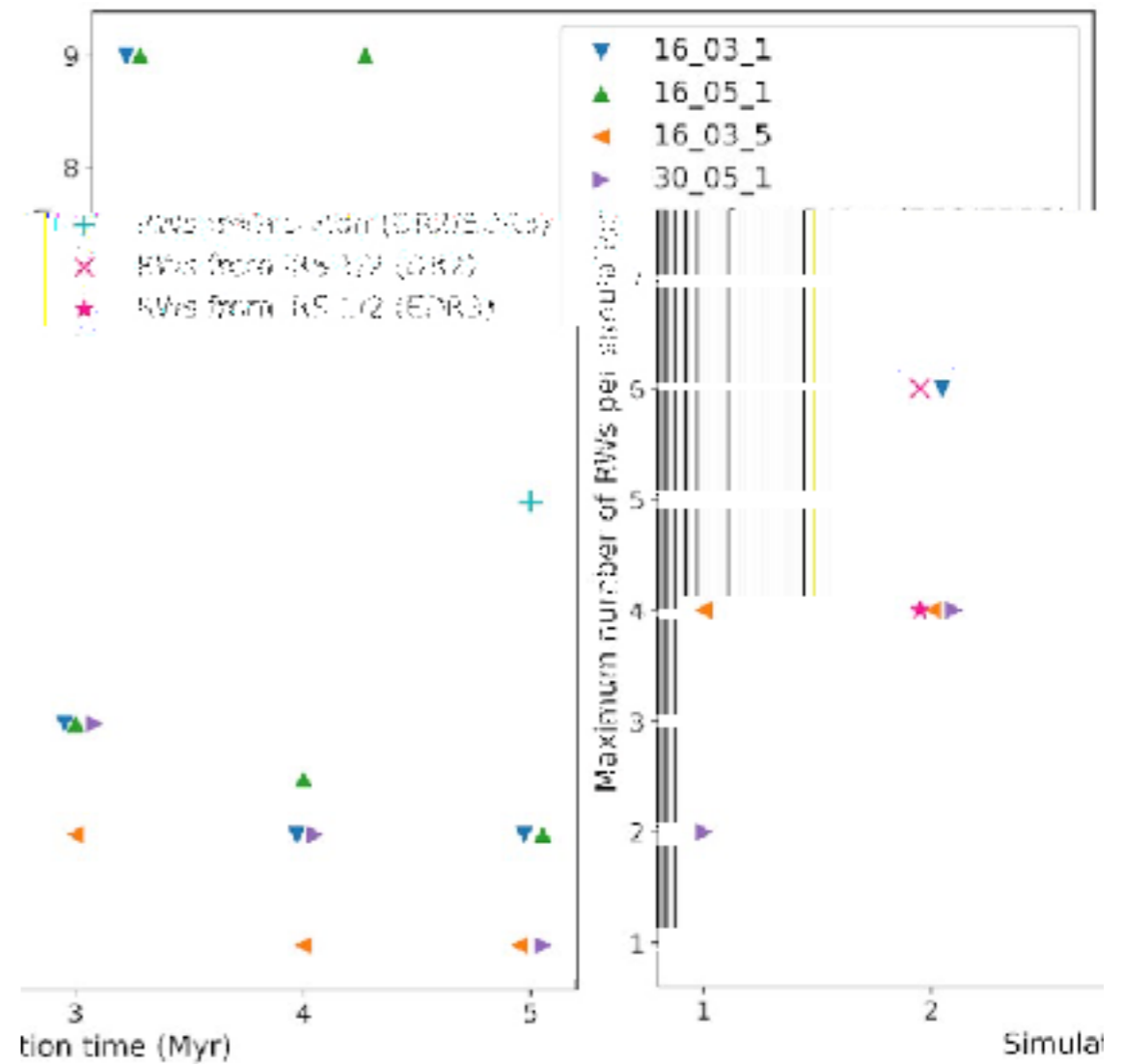


SM  
RW, WW 候補星,  $Sc \ e \ e +22 F \ .5$

IRS1/IRS2 についても同様の解析. 2 M .

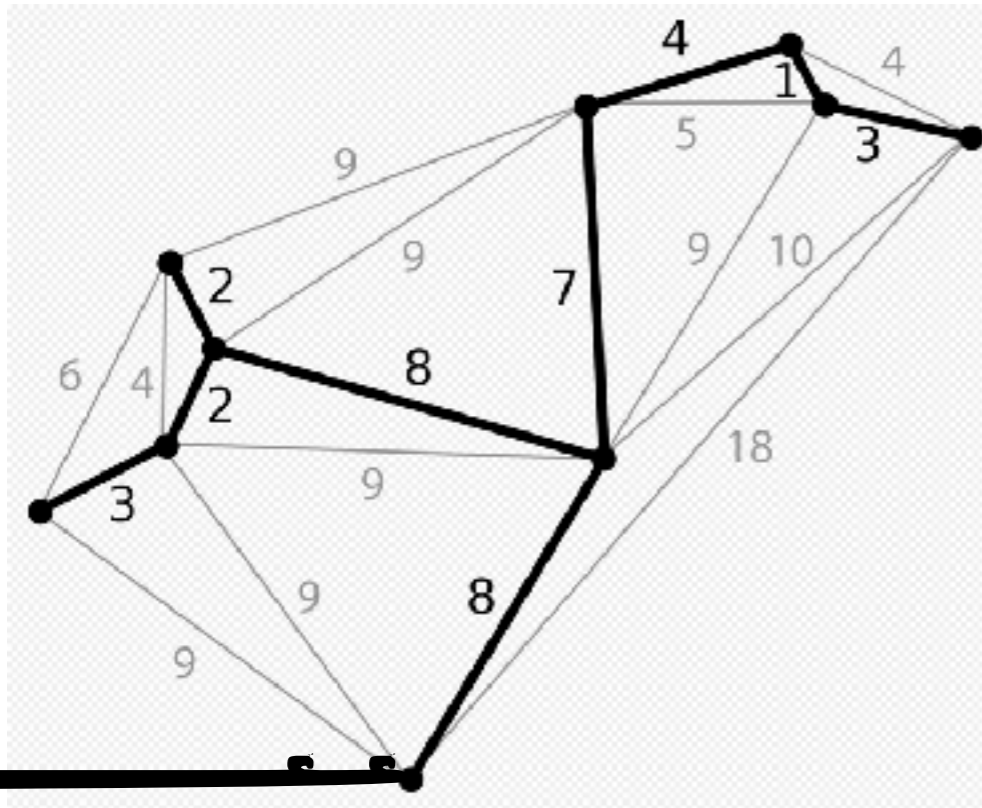
N体シミュレーションとの比較

$Sc \ e \ e +22 F \ .5$



# Complete graphの性質を数値化

Minimum Spanning Tree (MST) Weight



Q-parameter is the mean length of the MST,  $\bar{m}$ , divided by the mean edge length of the complete graph,  $\bar{s}$ :

$$Q < 0.7 \text{ c}$$

$$Q > 0.9$$

$$Q = \frac{\bar{m}}{\bar{s}}$$

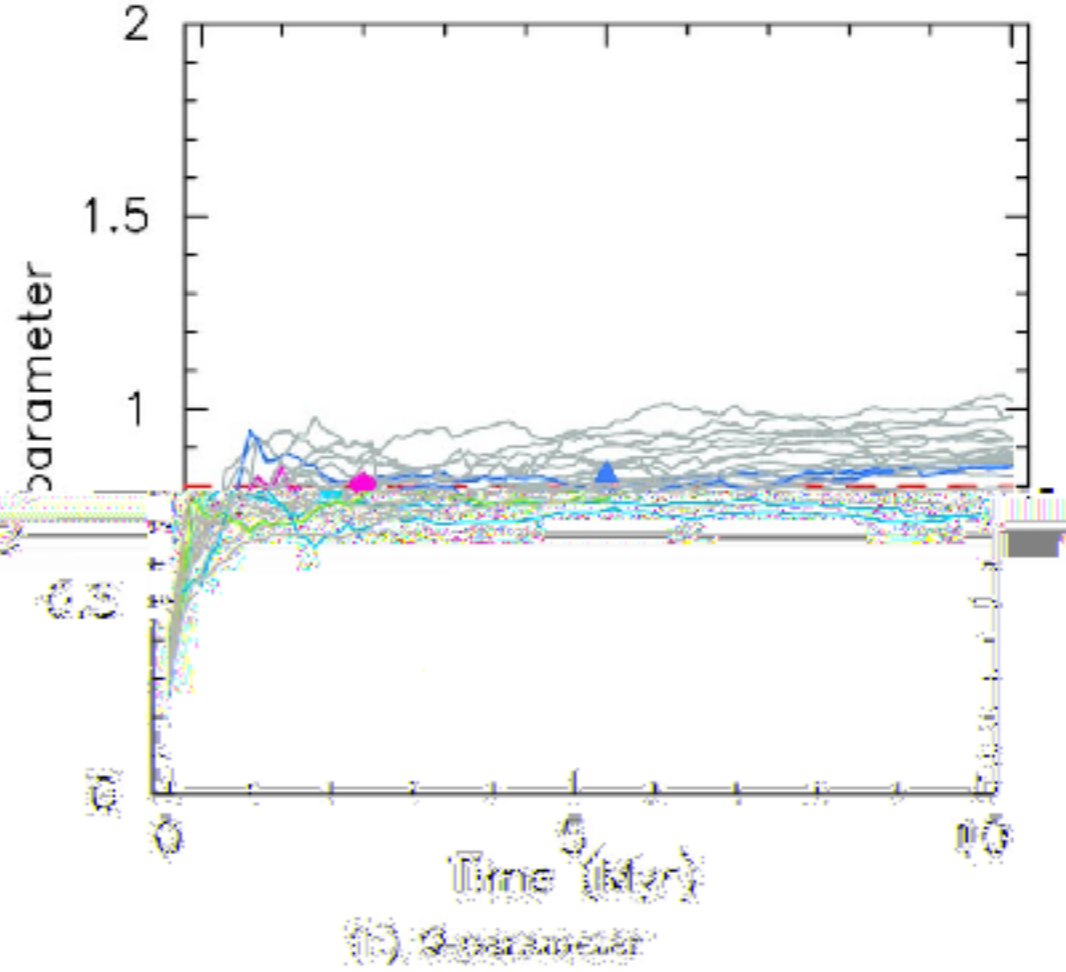
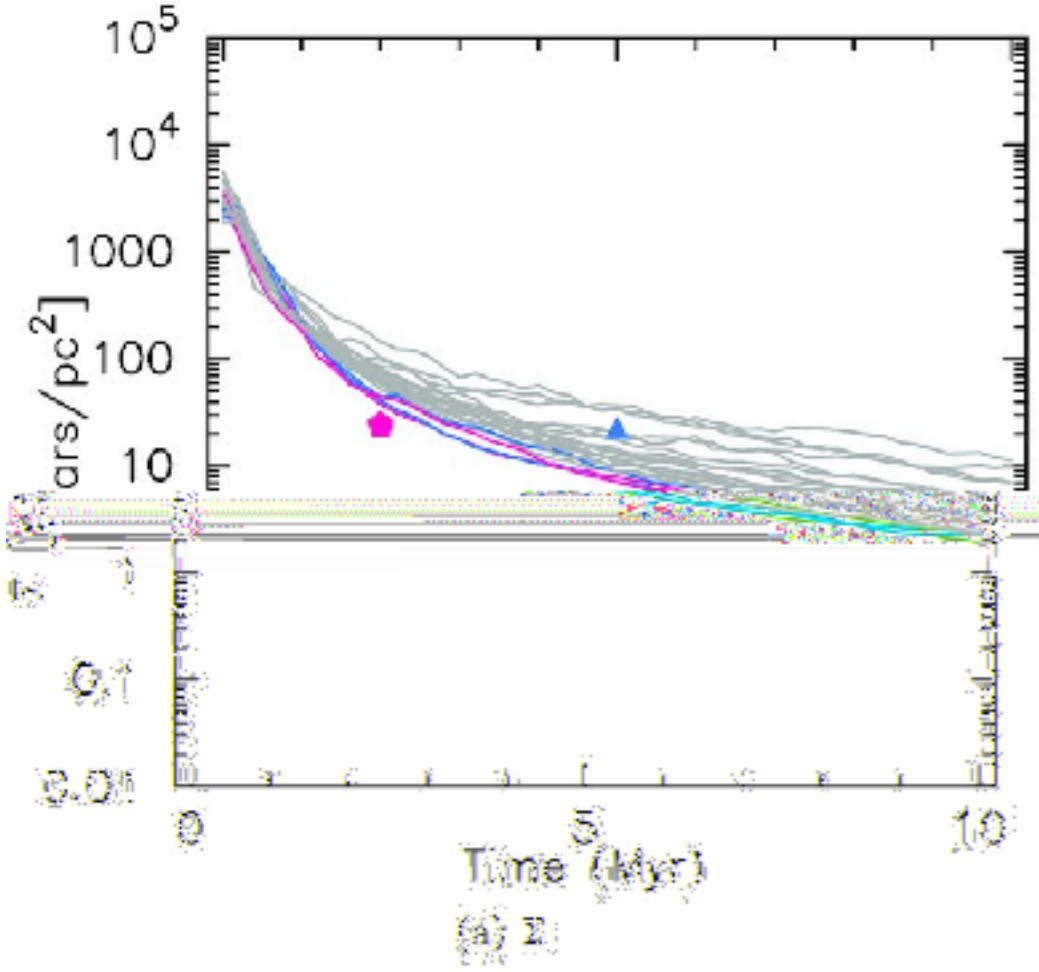
Maximum area

$$\Lambda_{MSR} = \frac{\langle l_{\text{average}} \rangle + \sigma_{5/6} l_{\text{subset}}}{l_{\text{subset}} - \sigma_{1/6} l_{\text{subset}}},$$

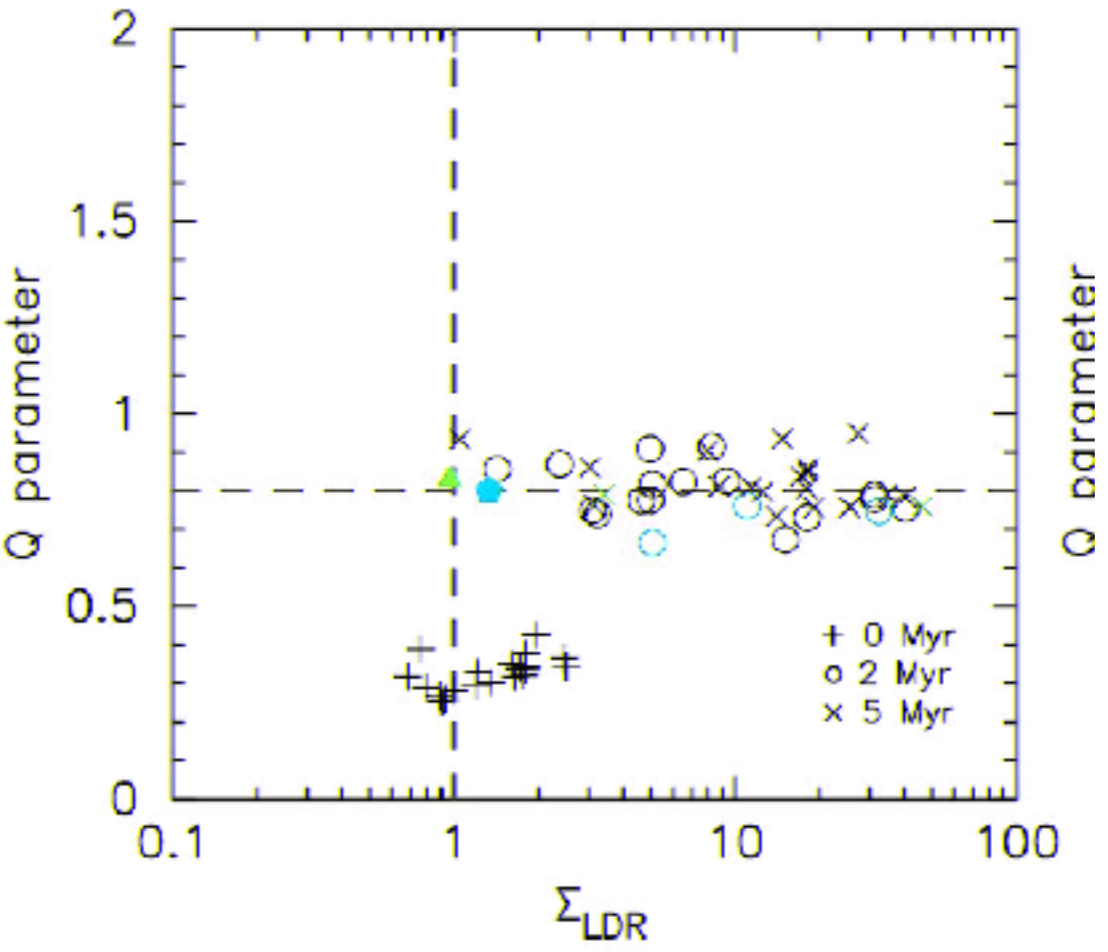
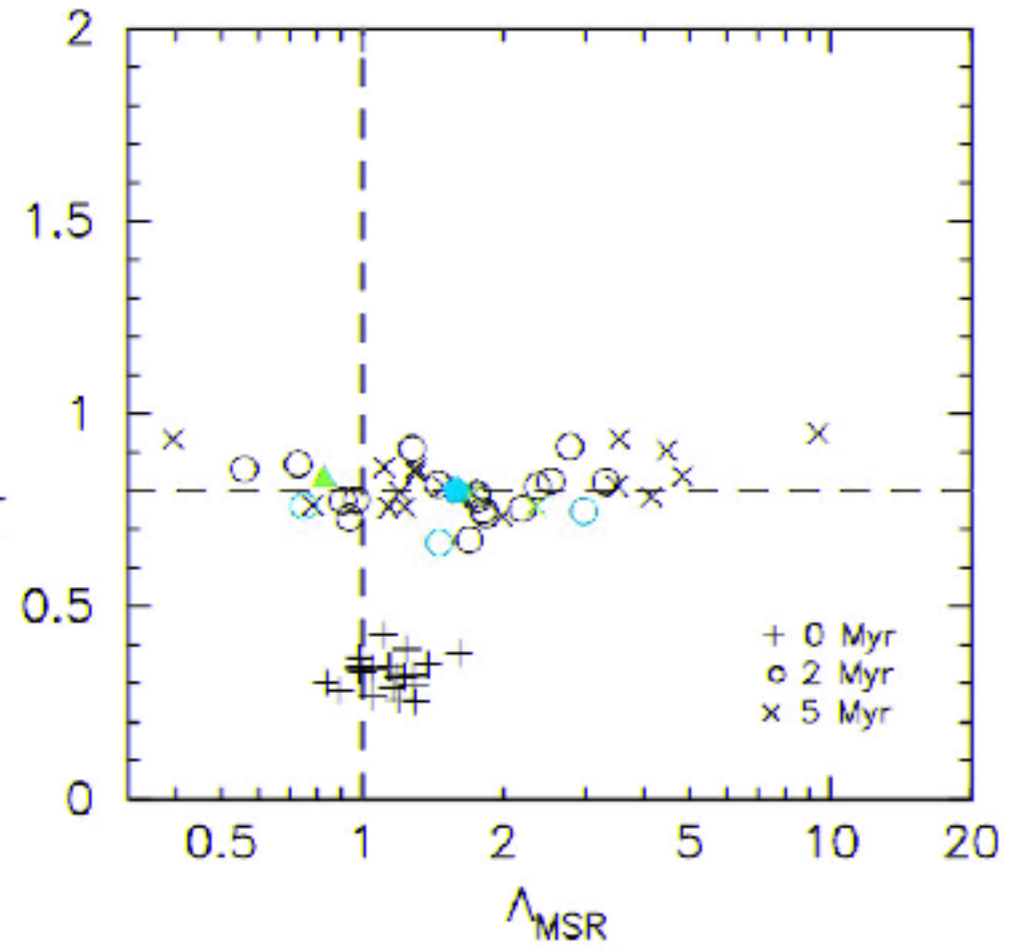
Surface de

$$\Sigma = \frac{N - 1}{\pi r_N^2},$$

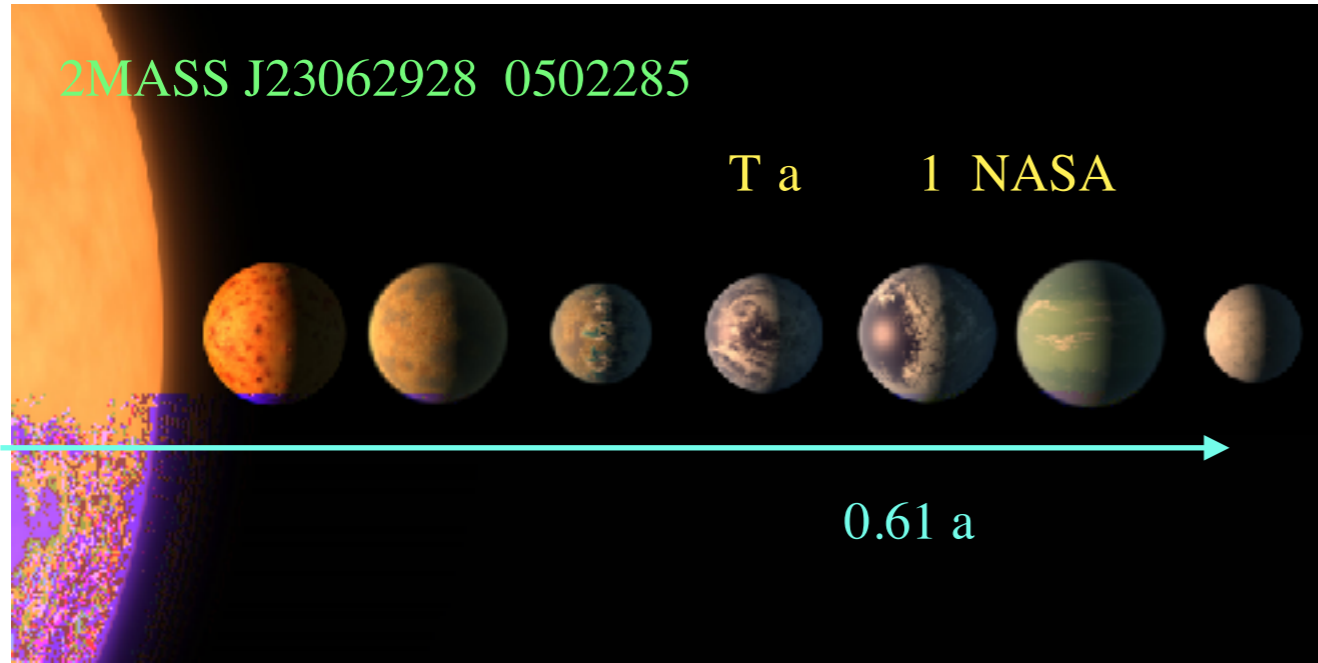
$$N = 10$$



初期状態は  
 b c e  
 の割合が  
 高く、( b )  
 a であつ  
 たはず



N . 21 A e a, e acc e a d a e de, e e  
 T a -1 e a e e , S.N. Ra d e a . Na e A , 6, 80 (2022)



T a P a e a d P a e e a  
 S a T e e c e  
 $d = 12 \text{ c}$ ,

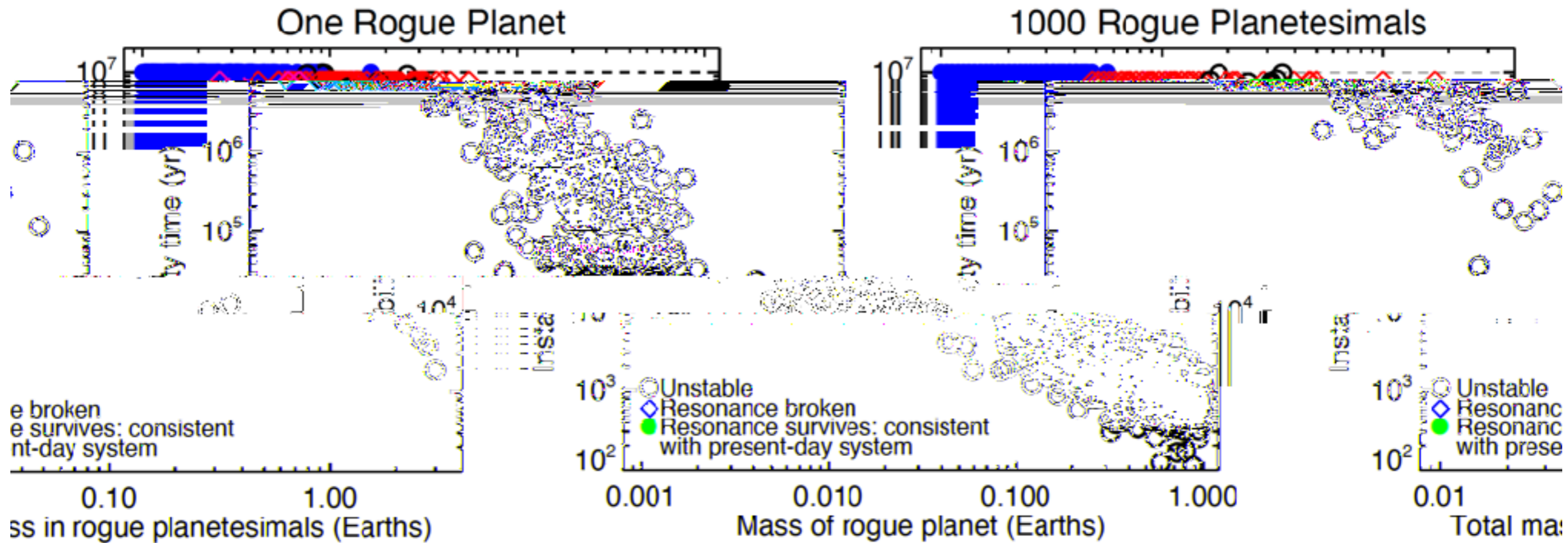
コンパクトな惑星系

共鳴軌道 8:5, 5:3, 3:2, 3:2, 4:3, 3:2

外から微惑星が乱入したら共鳴が  
 壊れる→共鳴を保つ静穏な環境→  
 水が供給されない

Planet	Mass ( $M_{\oplus}$ )	Radius ( $R_{\oplus}$ )	Semimajor Axis $a$ (AU)	Eccentricity $e$	Longitude of periastron $\varpi$ ( $^{\circ}$ )	Mean Anomaly $M$ ( $^{\circ}$ )
<b>Fiducial (Set 1)</b>						
b	1.3925	1.1174	0.011551	0.002344	253.61247	105.78489
c	1.2943	1.0967	0.015820	0.001224	132.62793	54.89836
d	0.3958	0.7880	0.02229	0.005045	202.45580	171.39157
e	0.6824	0.9200	0.02030	0.007013	52.47007	30.07582
f	1.0634	1.0448	0.038551	0.008298	170.04247	247.44087
g	1.3464	1.1294	0.046896	0.003760	355.97714	87.27858
h	0.3198	0.7552	0.061963	0.003571	172.18673	118.58431

R e a e e a : (1) 単一の微惑星が落下, (2) 多数の微惑星の落下

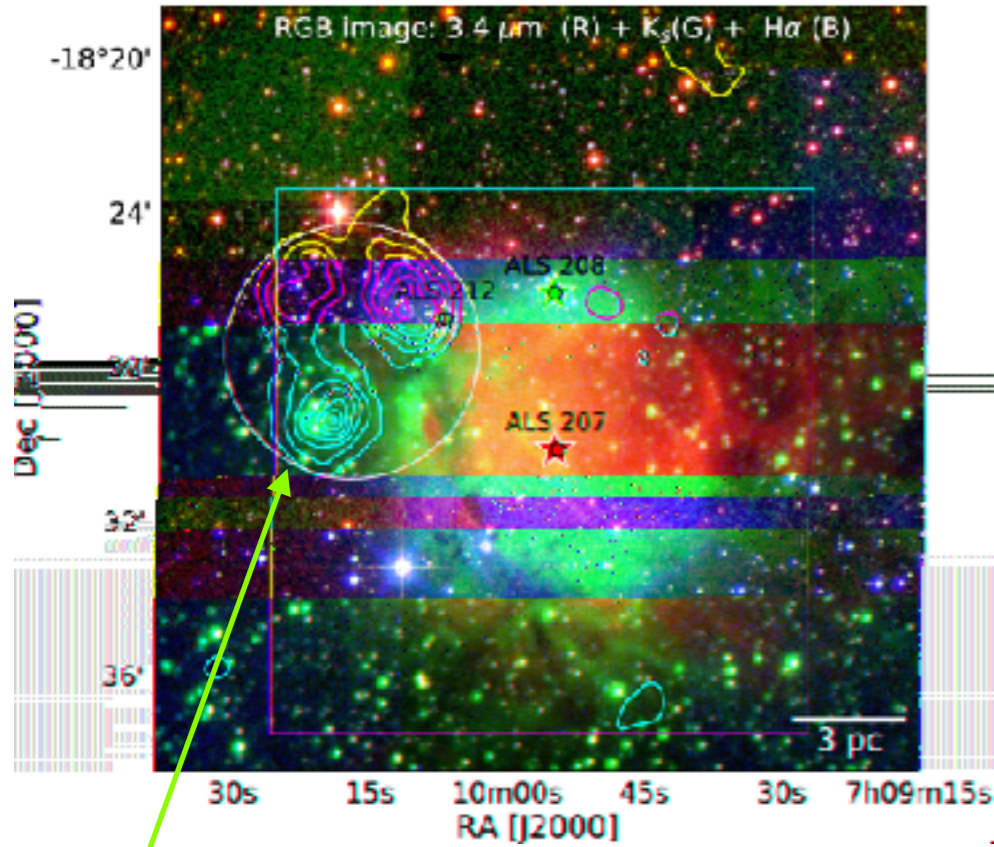


Planet	Orbital radius (AU)	Maximum bombardment mass ( $M_{\oplus}$ )	Maximum water delivered (Earth oceans)
b	0.0115	0.00038	0.15
c	0.0158	0.0015	0.64
d	0.0223	0.0016	0.68
e	0.0293	0.0035	1.54
f	0.0385	0.008	3.41
g	0.0469	0.018	7.62
h	0.0620	0.012	6.16



N 20 S 2.301: a b e ed H e de a f a ,  
 R. Pa de e a ., A J, 926, 22 (2022)

F . 1

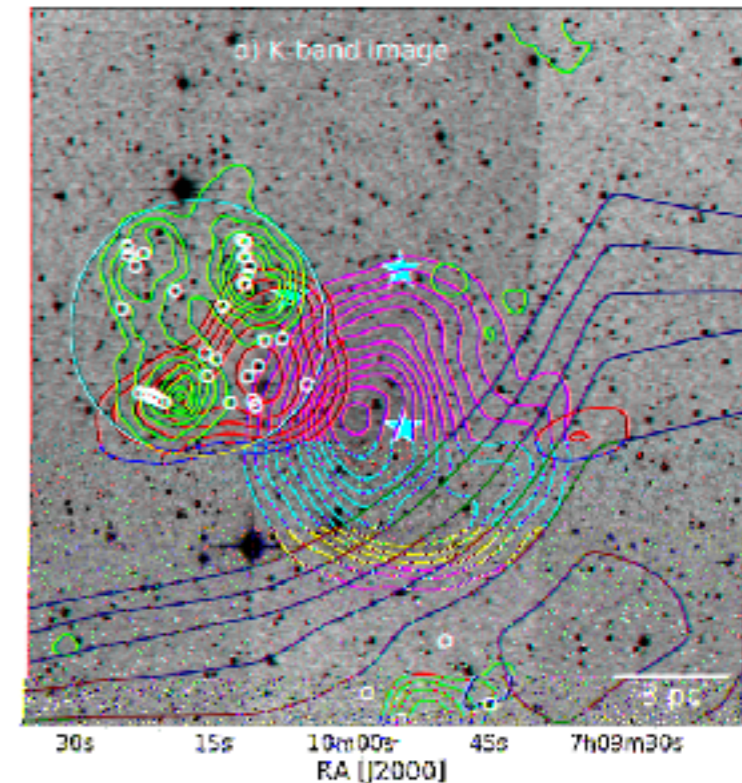
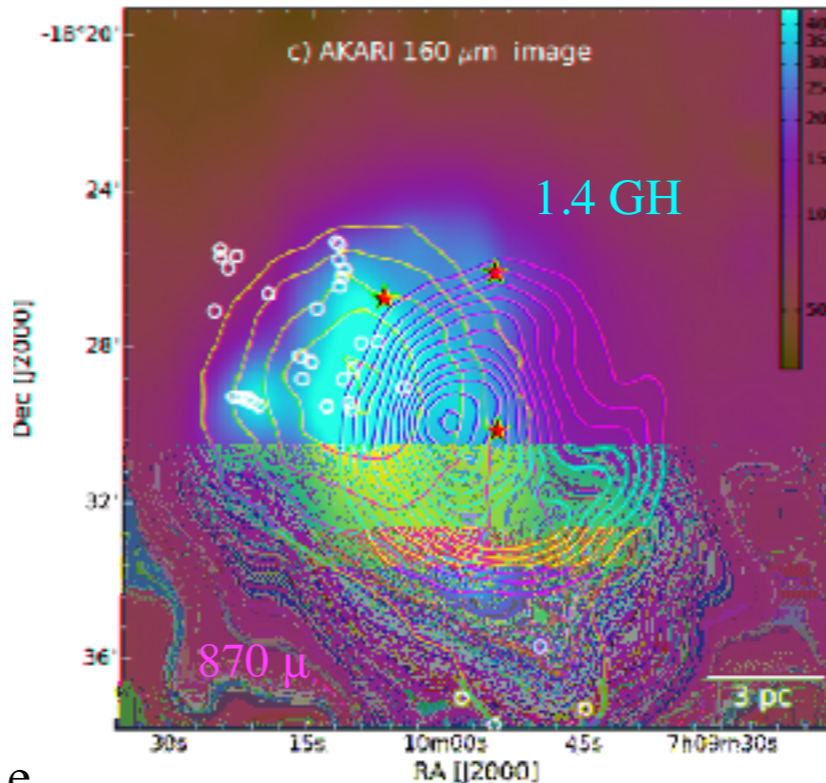
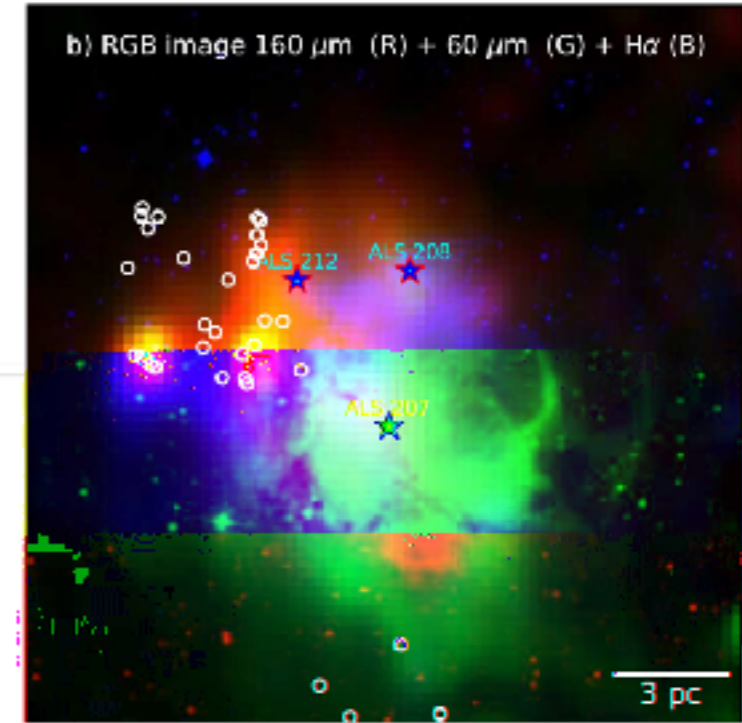
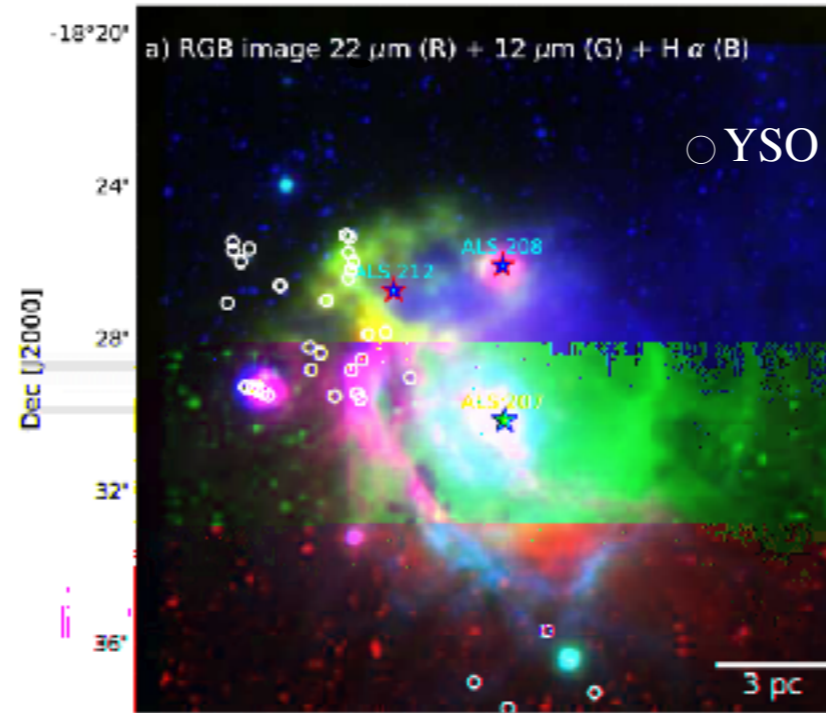


ALS 207 O6.5V  
 5 M  
 ALS 208 B1III  
 ALS 212 B1V  
 若い  $\sim 1.5$  M

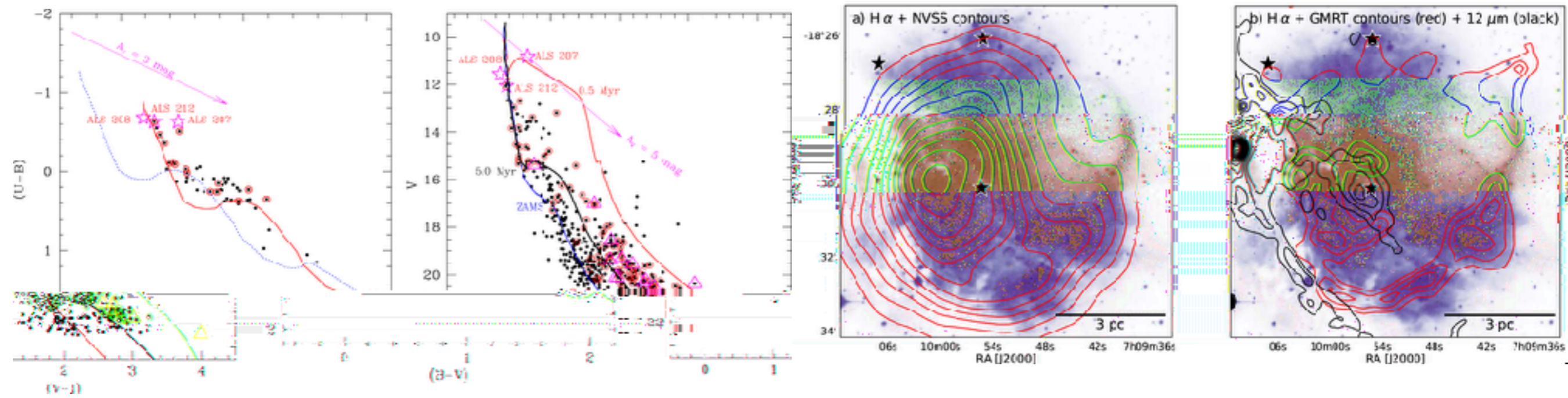
NE c e  
 星の面密度

撮像と分光( $\lambda/\Delta\lambda=1200$ )はインドの望遠鏡

2MASS, S e , AKARI, WISE, P a c , Pa e



S a E c 1.4 GHz HI



NE c e 194 メンバー 距離は

3.54 c S 2-301 と同じ

ALS 207により e され形成

S 2-301 の従来の距離 5.8 c は  
過大評価 (赤化側が異常  $R_V = 3.7$ )

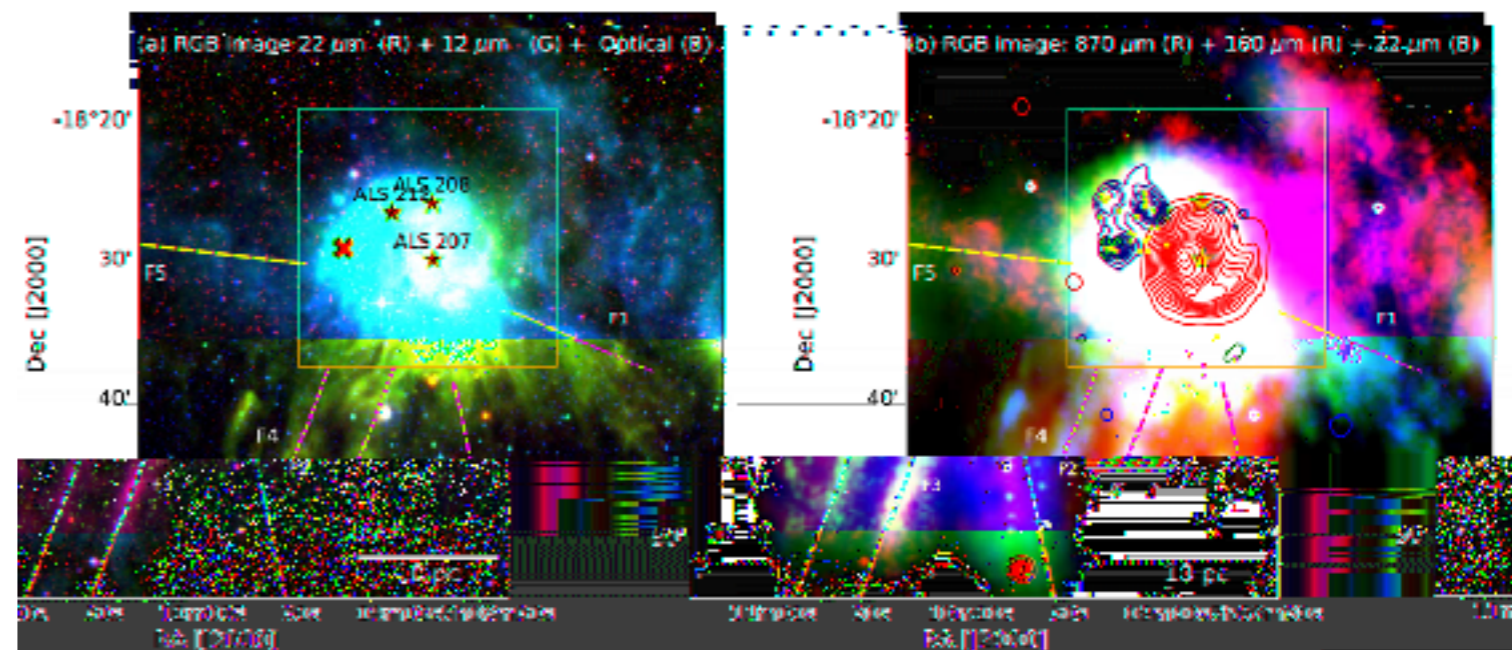
Ma f c  $N \propto M^{-0.87 \pm 0.07}$

( $0.4 < M/M_\odot < 7$ ) やや平坦

NW側はガス密度が極端に低い

ALS 207からのUVは漏れている

ALS 207はHFS で出来た(かも)



N.22 A e e d f ea e 3D b e e c d e f  
 ec a c d , M. S e a & C. Fede a , MNRAS, 509, 5237 (2022)

観測された線幅から乱流の強さを見積もる方法の開発

速度分散で視線方向の成分だけが見える.  $\sqrt{3}$  倍するだけで良い??

$$\sigma_{i, \text{los}} = \sqrt{\frac{\sum_p \sigma_{v_{\text{los } p}}^2}{N_p}}, \quad \sigma_{v_{\text{los } p}} = \left( \langle v_{\text{los}}^2 \rangle_p - \langle v_{\text{los}} \rangle_p^2 \right)^{\frac{1}{2}} \quad \forall p, \quad \langle v_{\text{los}} \rangle_p = \frac{\sum_{i=1}^{N_{\text{los}}} \rho_i v_{\text{los } i}}{\sum_{i=1}^{N_{\text{los}}}} \quad \forall p, \quad \langle v_{\text{los}}^2 \rangle_p = \frac{\sum_{i=1}^{N_{\text{los}}} \rho_i v_{\text{los } i}^2}{\sum_{i=1}^{N_{\text{los}}}} \quad \forall p.$$

著者がお薦めの推定法

$$\sigma_{(\text{p-grad}), \text{los}}^2 = \sigma_{i, \text{los}}^2 + \sigma_{(\text{c-grad}), \text{los}}^2$$

天球面での速度勾配

$$\sigma_{(\text{c-grad}), \text{los}} \quad \left( \langle v_{\text{los}} \rangle - \text{grad}_{\text{los}} \right)_p = \langle v_{\text{los}} \rangle_p - \text{grad}_{\text{los}, p}$$

$$\text{grad} = a + bx + cy$$

