

Как мы искали толстые диски в основной плоскости edge-on галактик

Imprint of the thick stellar disc in the mid-plane of edge-on galaxies

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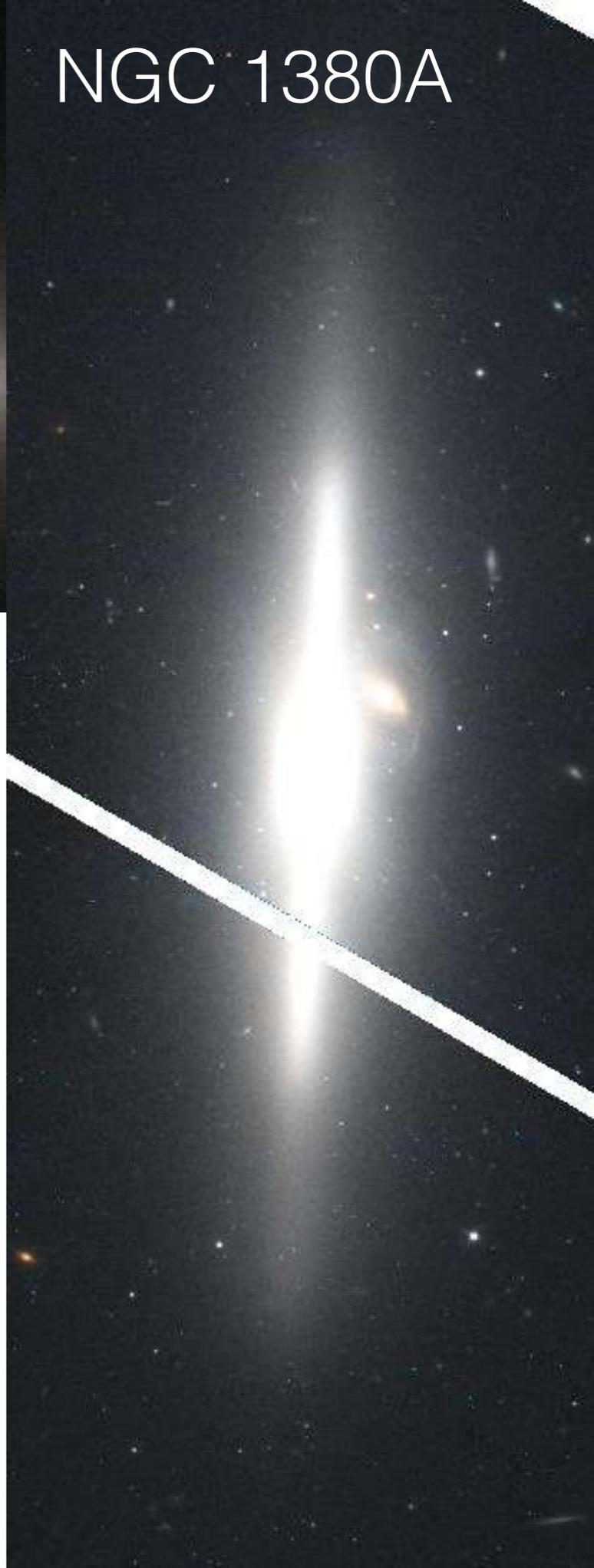
³*Southern African Large Telescope Foundation, PO Box 9, 7935 Observatory, Cape Town, South Africa*

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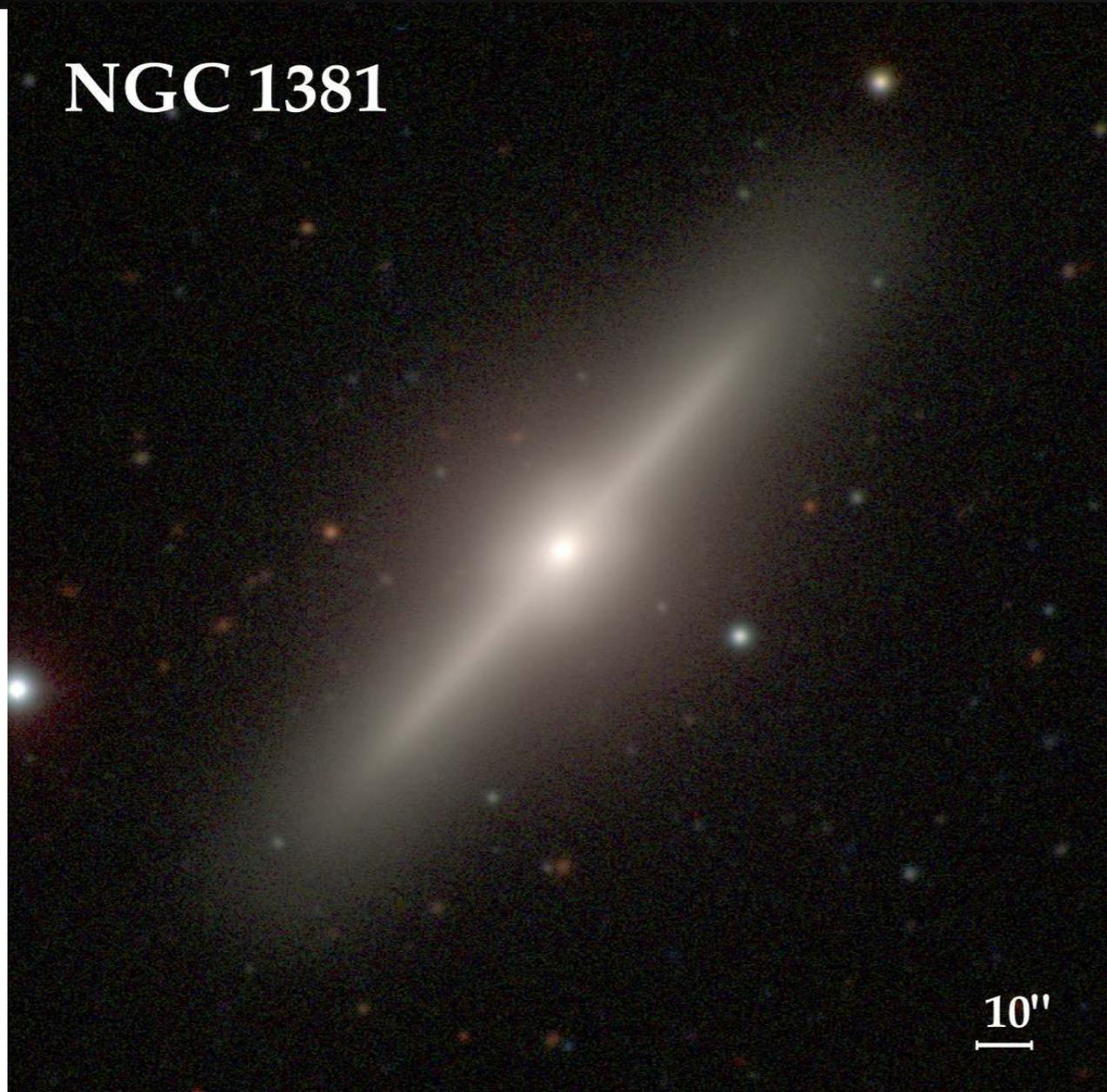
IC 335



NGC 1380A



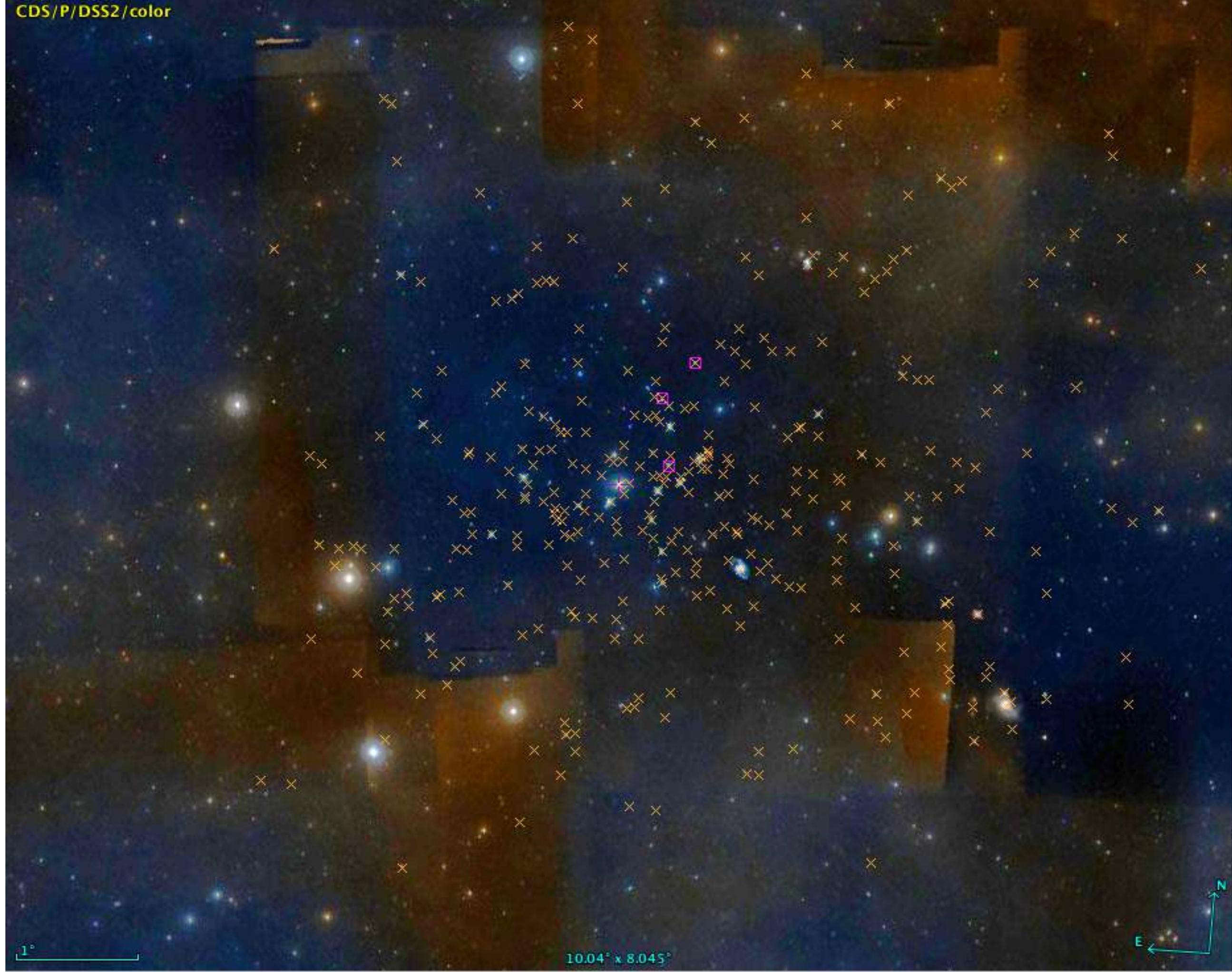
NGC 1381



10''

Толстые диски давно привлекают внимание

- *Фотометрически много, а спектроскопии мало*
- Photometry
 - Tsikoudi 79, Burstein 79, Erwin et al. 05, 08, Pohlen & Trujillo 06, Comerón et al 11, 12, 18, etc.
- Spectroscopy
 - Yoachim & Dalcanton 06, 08; Comerón et al. 15, 16; Guérou et al. 16; Kasparova et al. 16



1°

10.04° x 8.045°

N
E

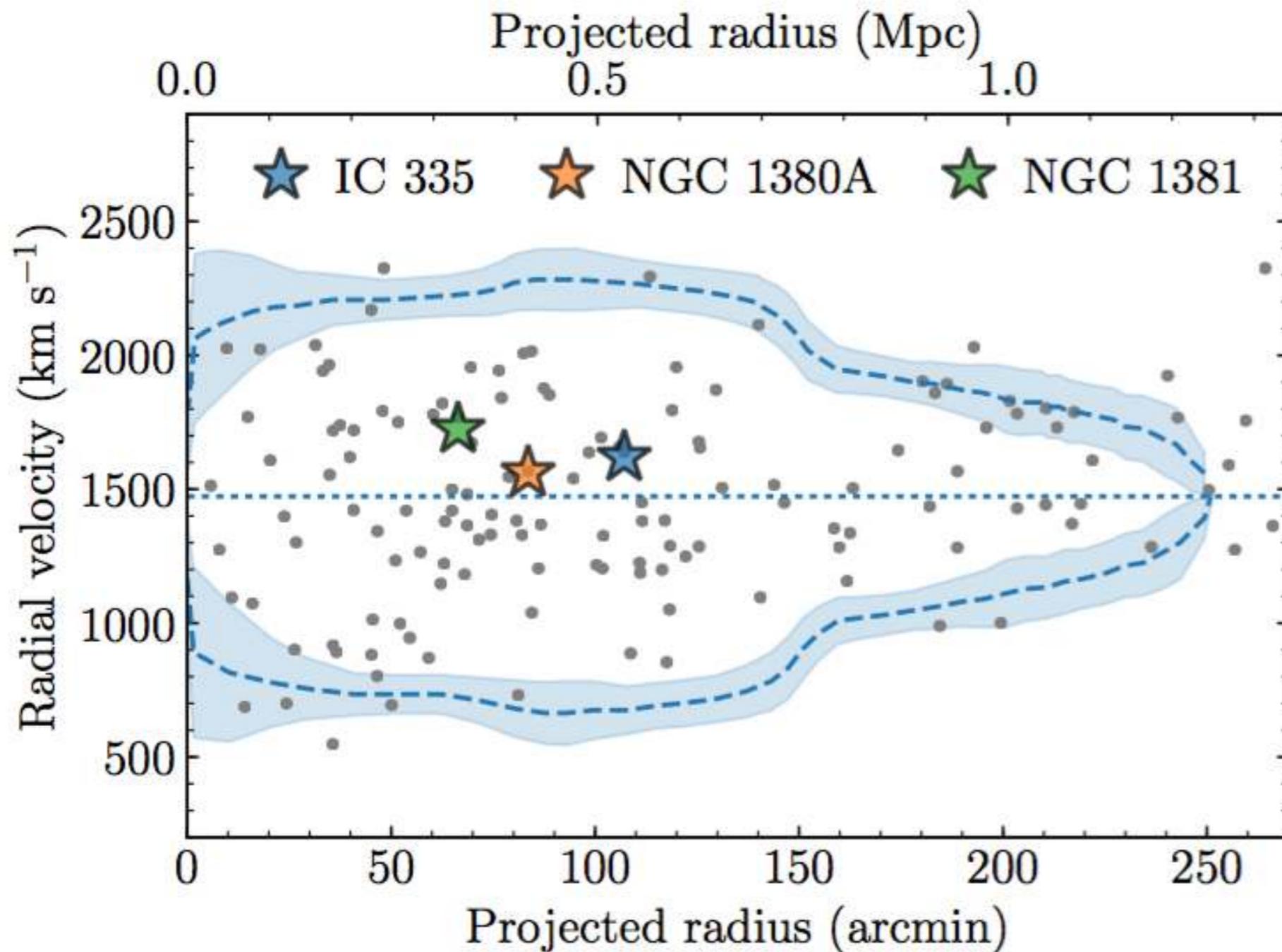


Figure 6. Projected distances and radial velocity differences for Fornax cluster members (gray points). Blue dashed line shows a caustic curve calculated by [Drinkwater et al. \(2001\)](#). It roughly corresponds to the escape velocity for a galaxy at a given distance from the cluster center. This diagram shows that our studied galaxies are dynamically bound to the main core of the Fornax cluster.

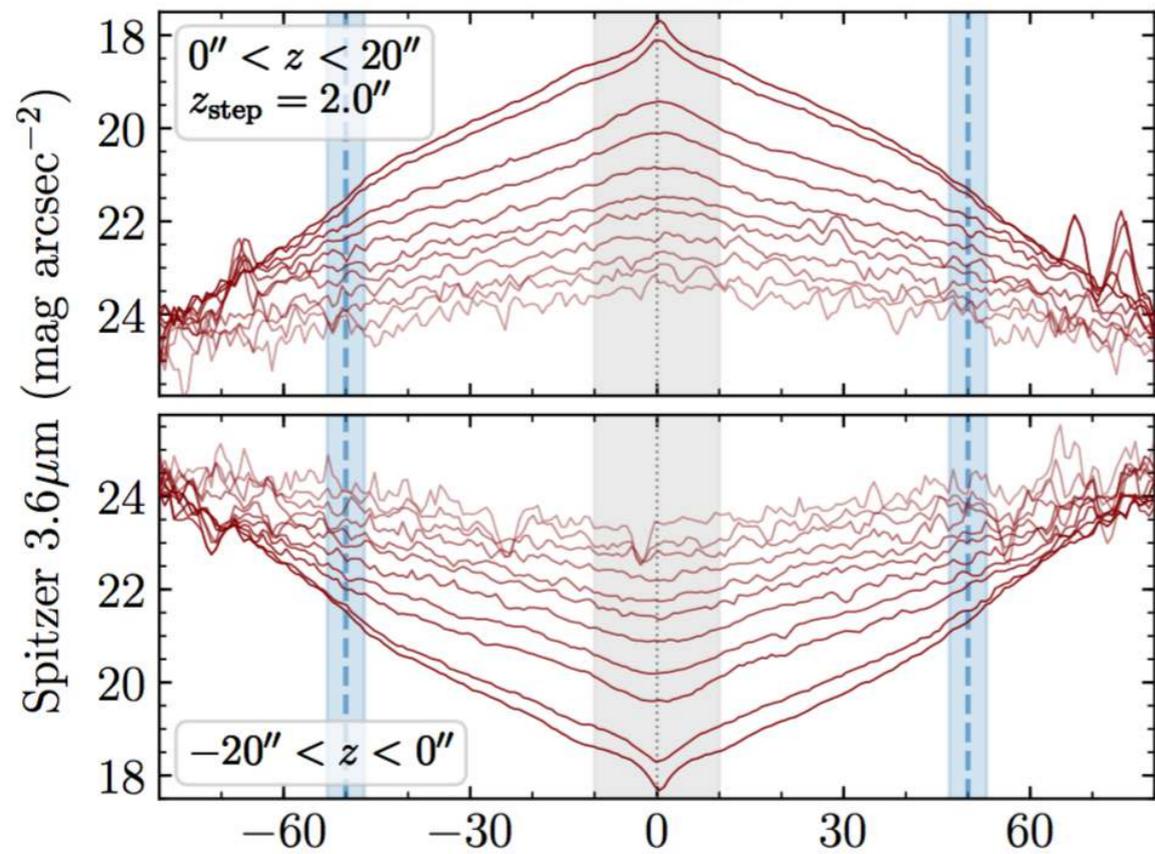
Наблюдения



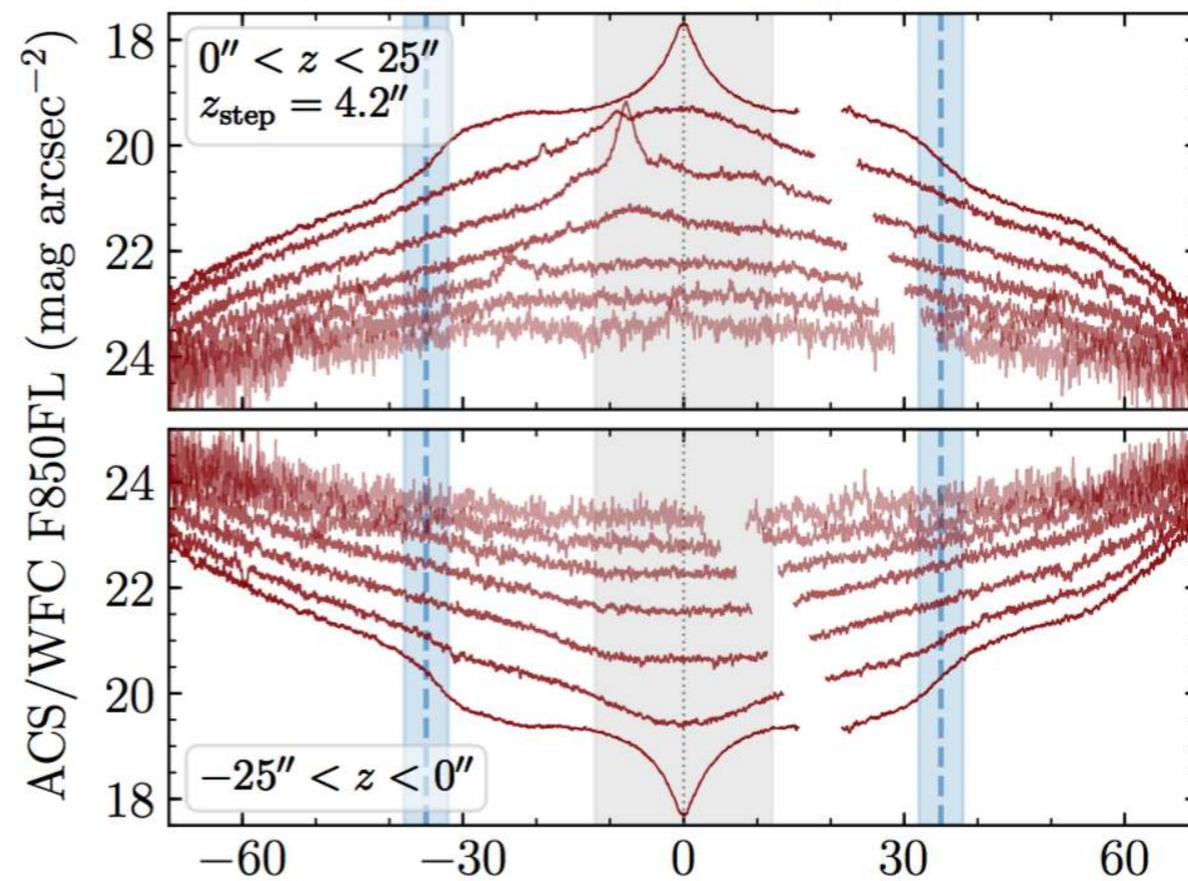
- RSS Spectrograph
- Long-slit mode
- 1.25" slit
- GR900 => 4.8A (~150km/s)

Galaxy	Date	Exposure (sec)	PA (deg)	Seeing (arcsec)
IC 335	2015-12-09	1200×2	84	2.2–2.7
	2016-02-13	1280×2	84	2.7
NGC 1380A	2015-12-16	1200×2	179	3.5
	2016-02-14	1300×2	179	2.7
NGC 1381	2015-12-08	1200×2	139	1.5
	2016-01-31	1300×2	139	3.5

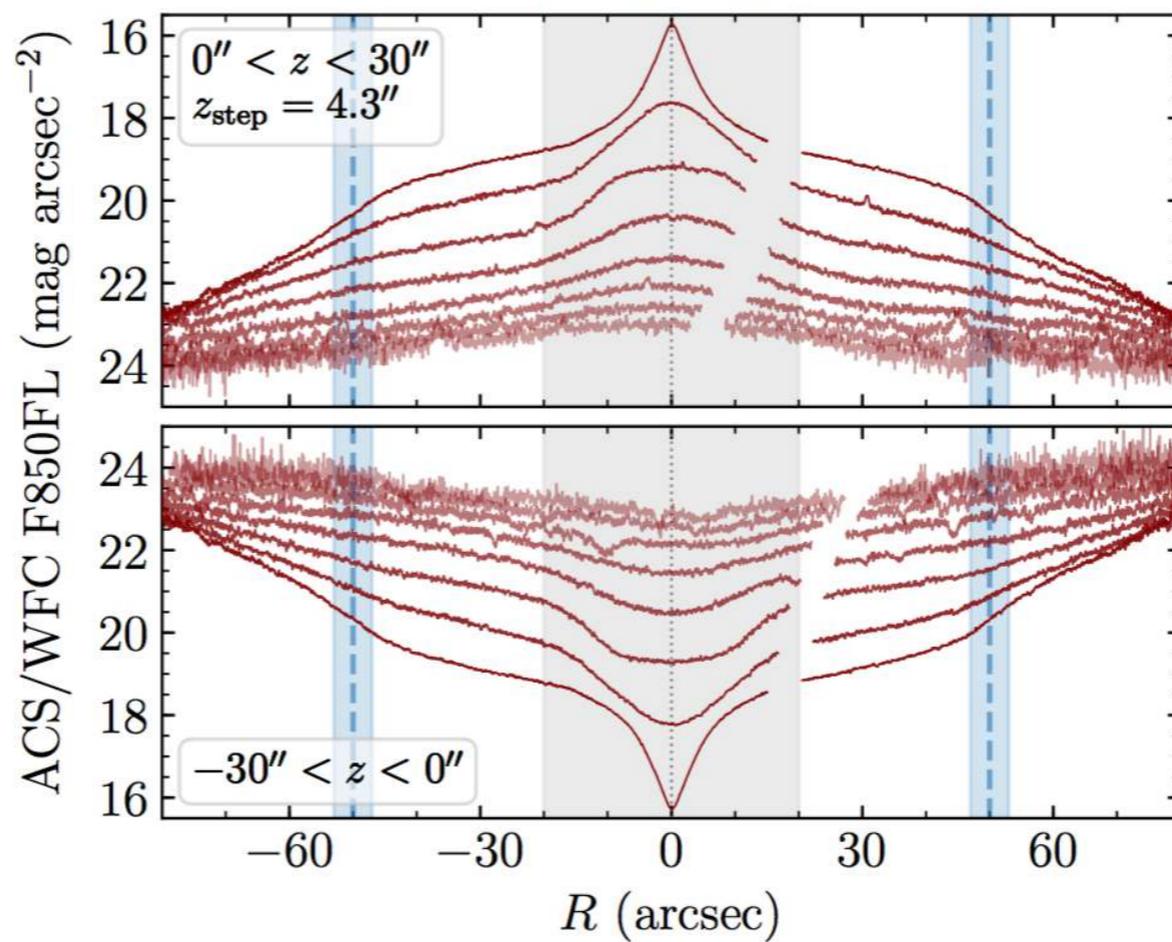
IC 335



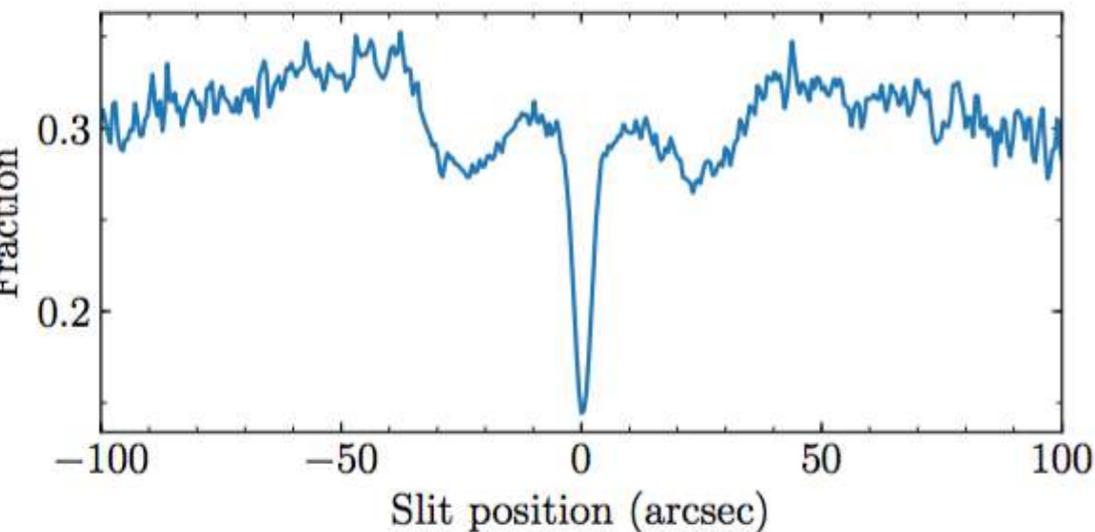
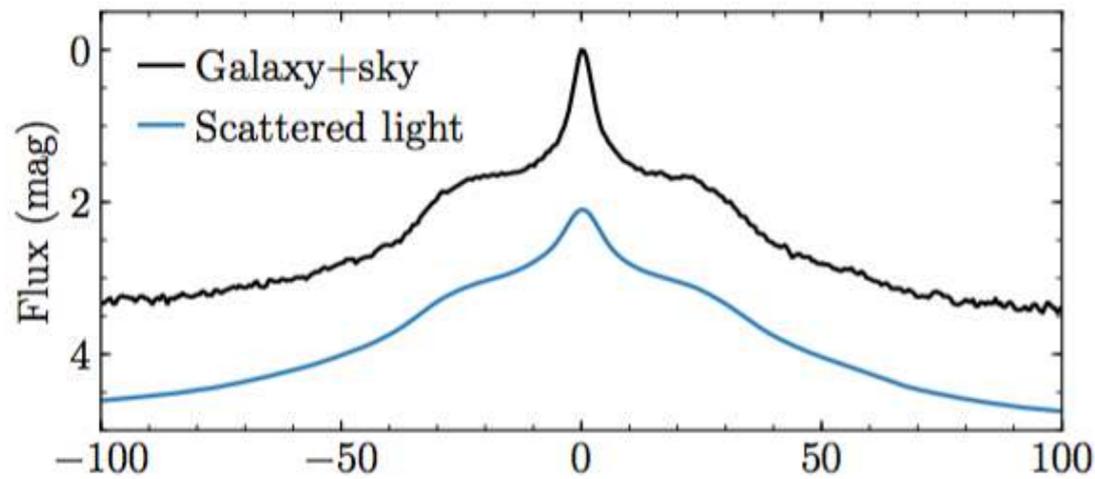
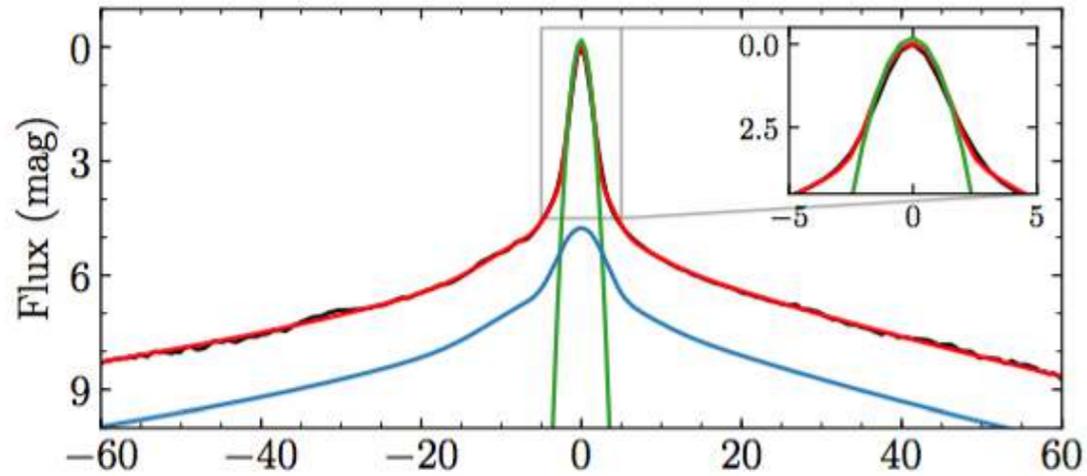
NGC 1380A



NGC 1381



Проблема рассеянного света



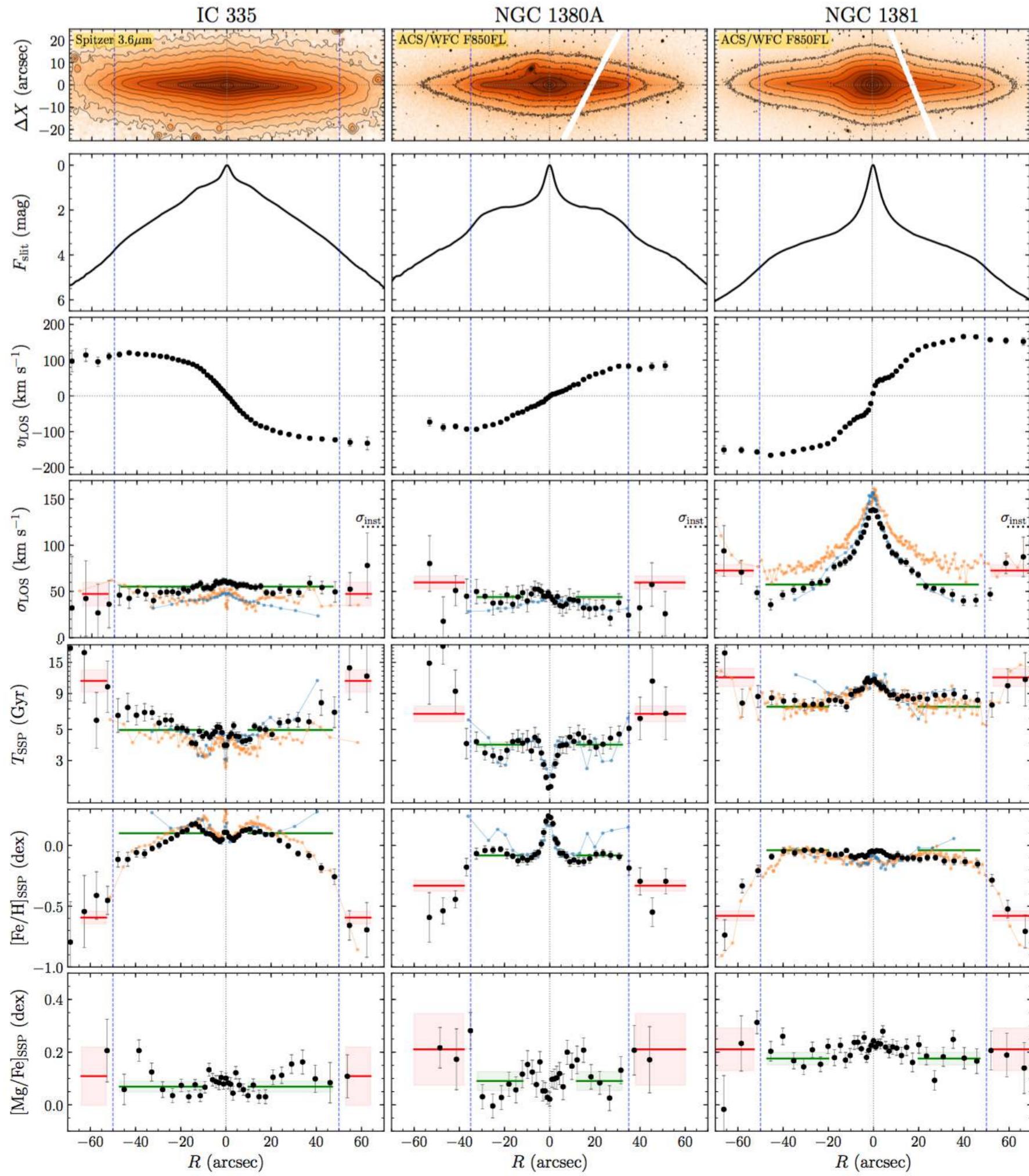
$$S_{\text{obs}}(y) = F_{\star} \cdot \text{PSF}_{\text{seeing}}(y) * \text{PSF}_{\text{scat}}(y) \approx \\ \approx F_{\star} \cdot \text{PSF}_{\text{seeing}}(y) * [\alpha \cdot \delta(y) + f_{\text{scat}}(y)], \quad (1)$$

$$G_{\text{obs}}(y) \approx G_{\text{PSF}}(y) * [\alpha \cdot \delta(y) + f_{\text{scat}}(y)] = \\ = \alpha \cdot G_{\text{PSF}}(y) + G_{\text{PSF}}(y) * f_{\text{scat}}(y), \quad (2)$$

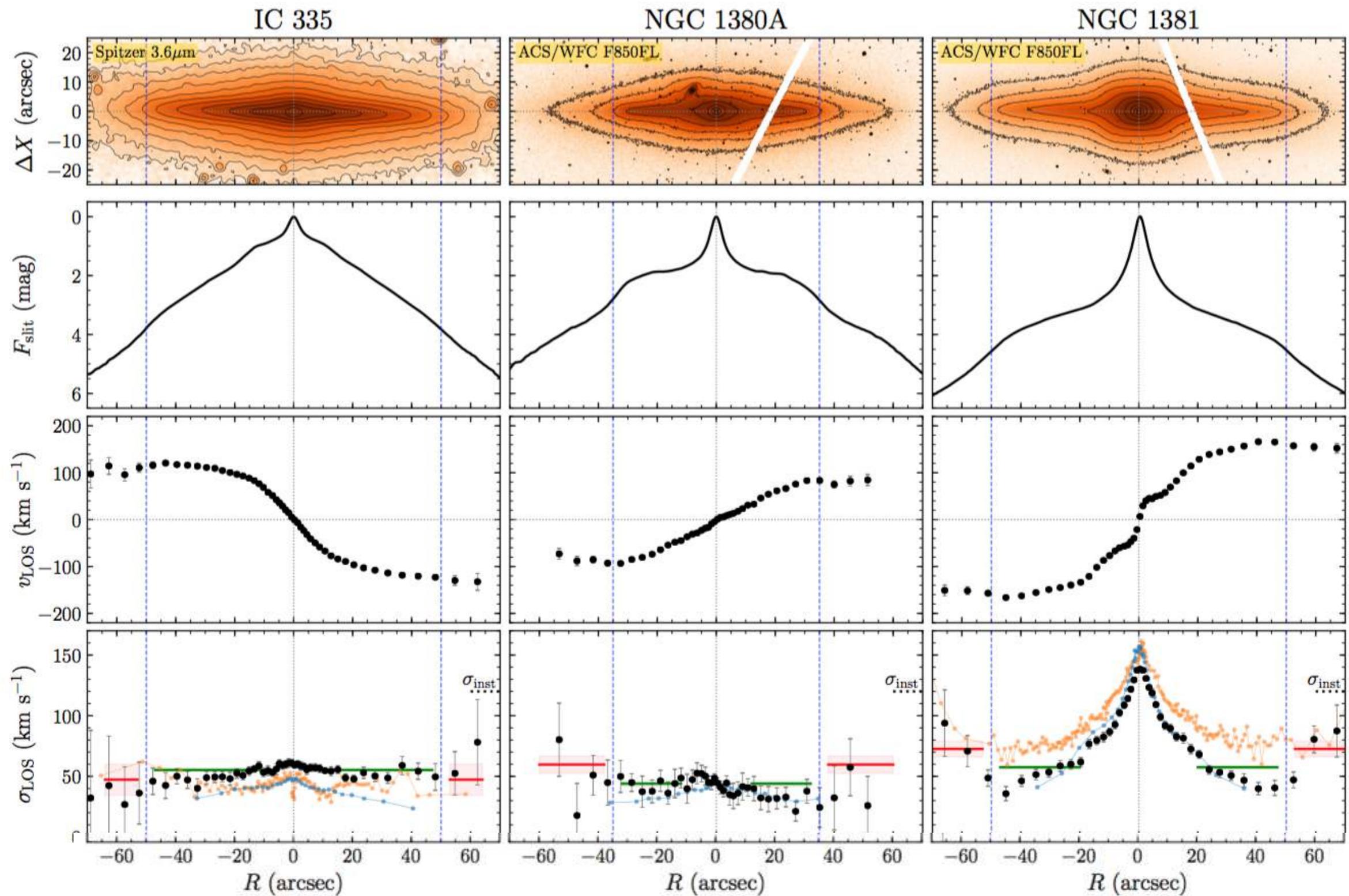
$$G_{\text{obs}} * f_{\text{scat}} = \alpha \cdot G_{\text{PSF}} * f_{\text{scat}} + G_{\text{PSF}} * (f_{\text{scat}} * f_{\text{scat}}), \quad (3)$$

$$G_{\text{obs}} * (f_{\text{scat}} * f_{\text{scat}}) = \alpha \cdot G_{\text{PSF}} * (f_{\text{scat}} * f_{\text{scat}}) + \\ + G_{\text{PSF}} * (f_{\text{scat}} * f_{\text{scat}} * f_{\text{scat}}). \quad (4)$$

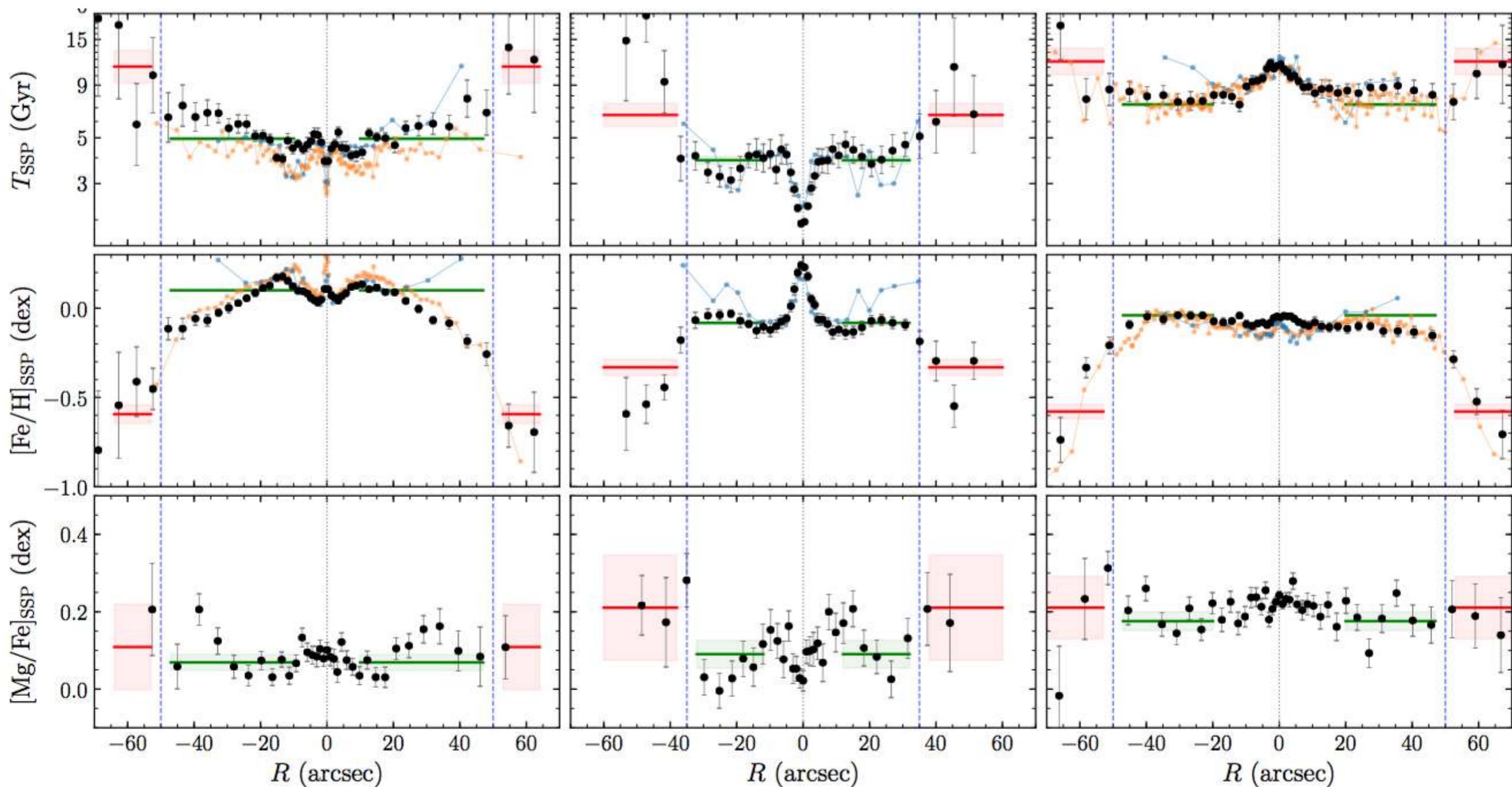
$$\alpha G_{\text{PSF}} = G_{\text{obs}} - \left[\frac{1}{\alpha} G_{\text{obs}} * f_{\text{scat}} - \frac{1}{\alpha^2} G_{\text{obs}} * f_{\text{scat}} * f_{\text{scat}} \right]. \quad (5)$$



Кинематика



Звездный населения



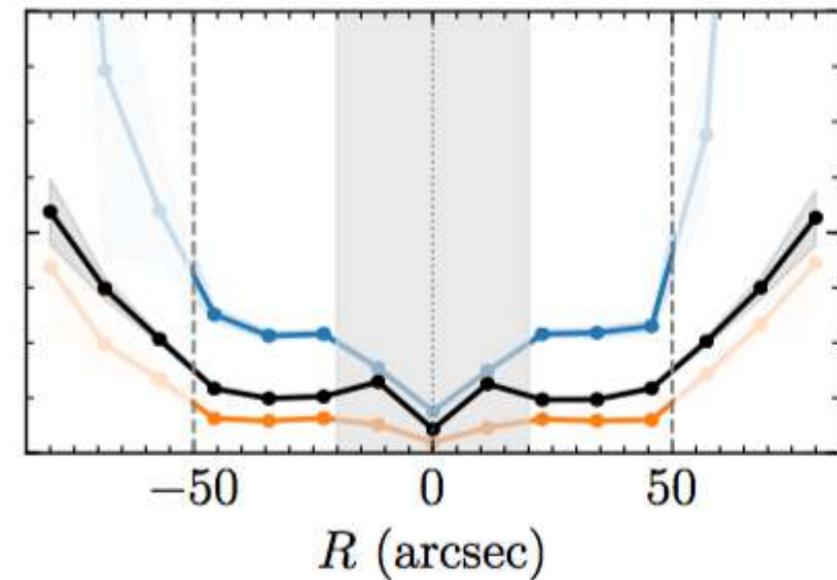
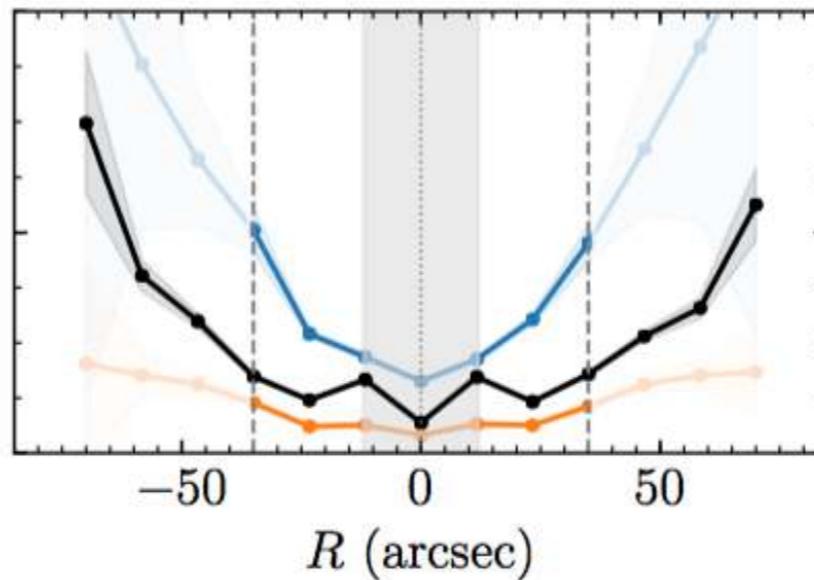
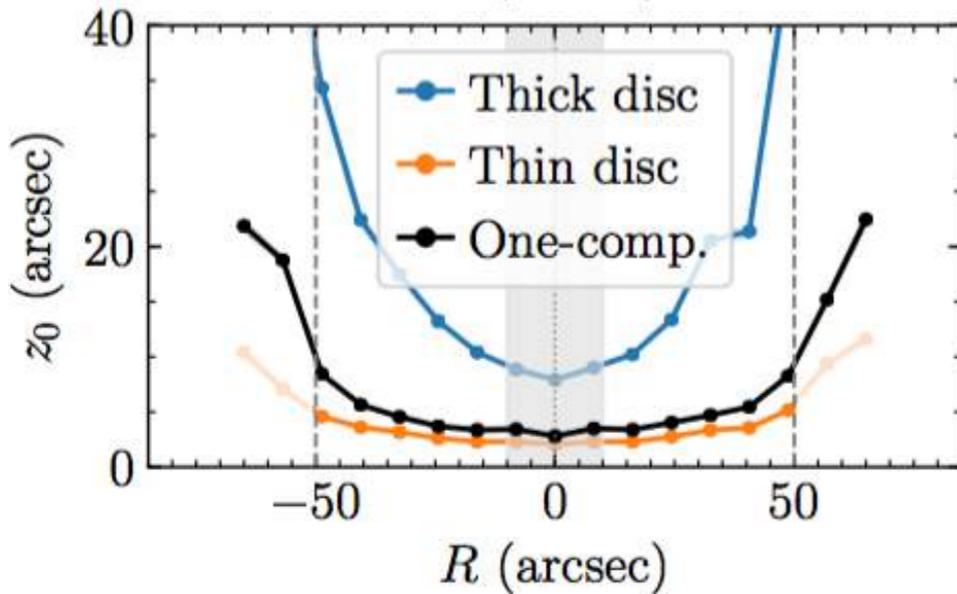
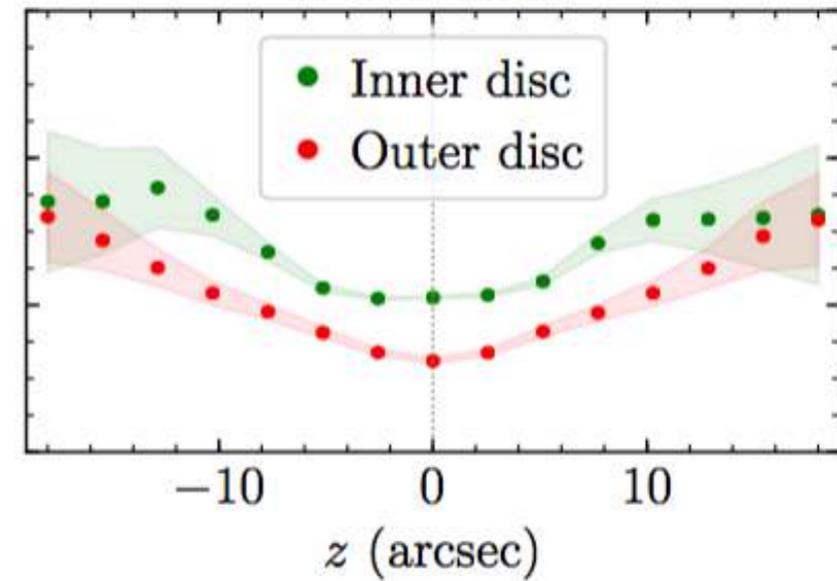
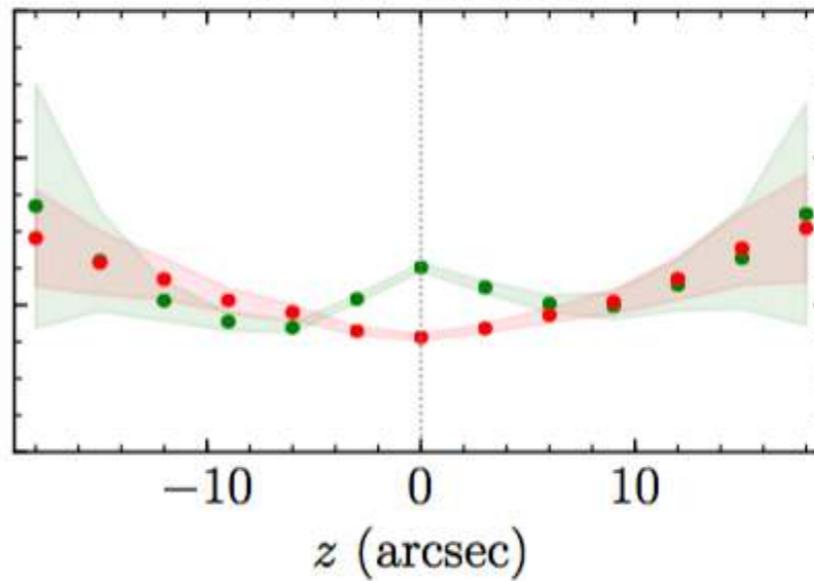
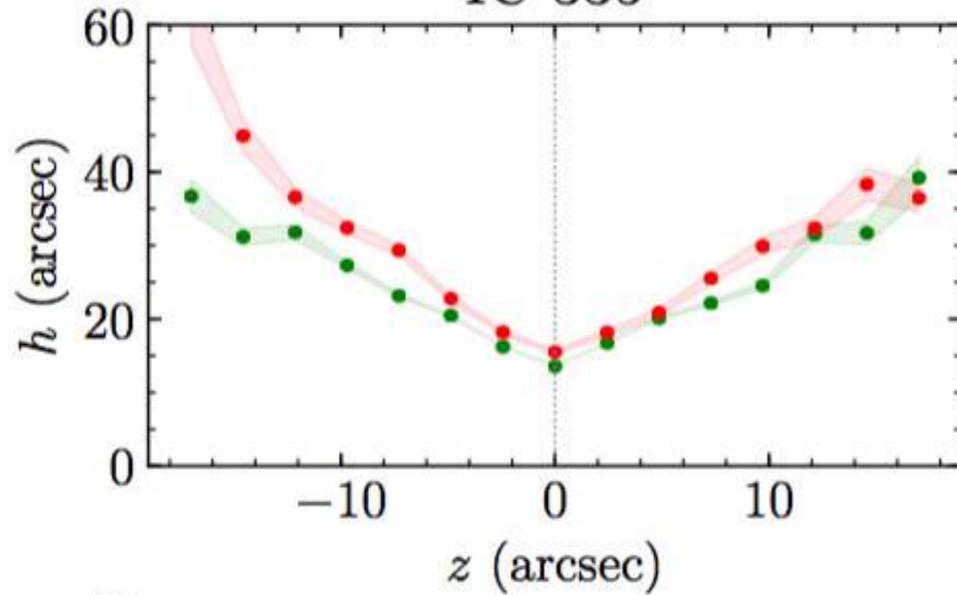
Фотометрическая ДЕКОМПОЗИЦИЯ

$$I_R(R, z) \propto \frac{R}{h(z)} K_1 \left(\frac{R}{h(z)} \right)$$

IC 335

NGC 1380A

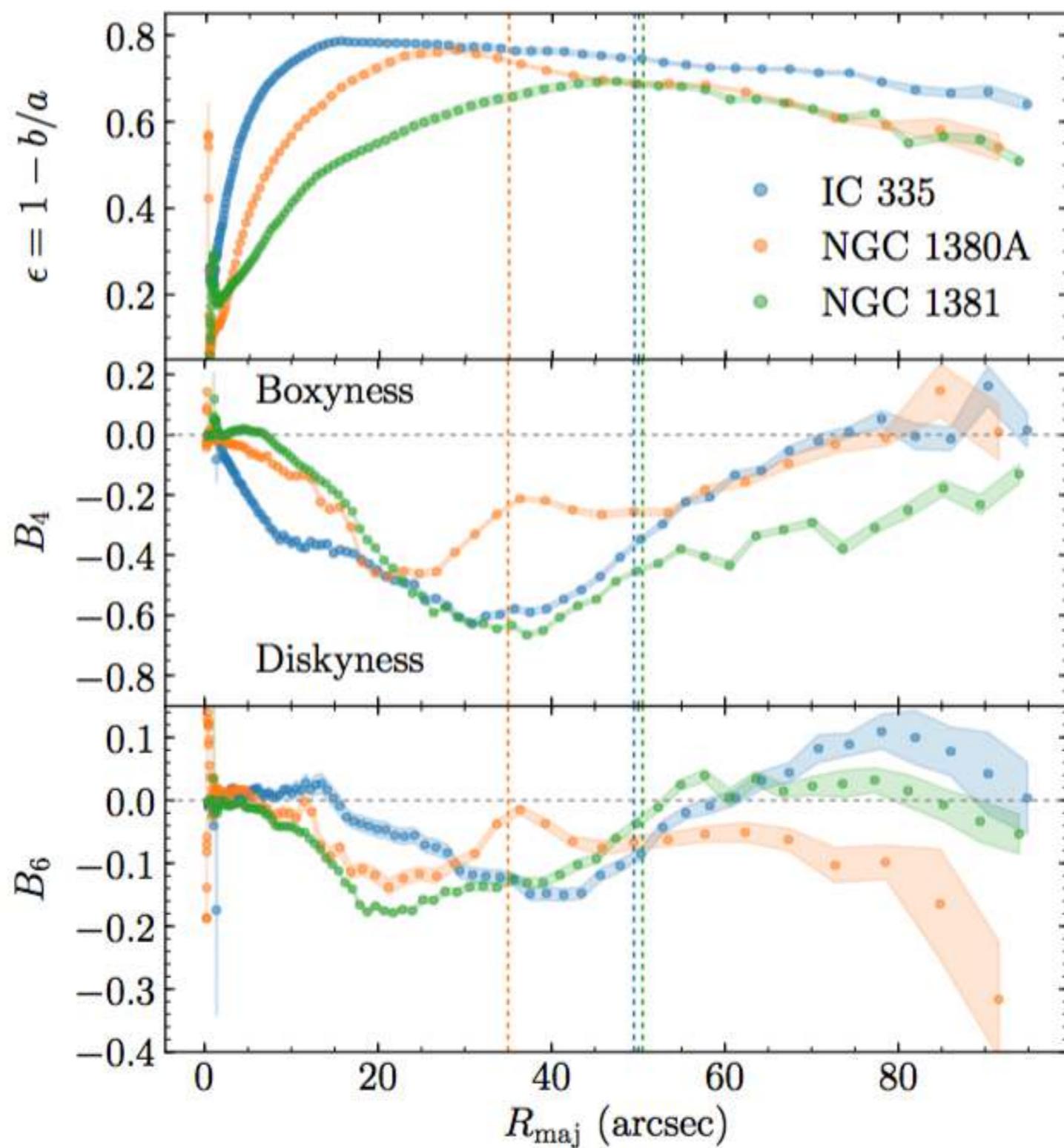
NGC 1381



$$I_z(R, z) = \mu_t(R) \operatorname{sech}^2 \left(\frac{z}{z_{0t}} \right) + \mu_T(R) \operatorname{sech}^2 \left(\frac{z}{z_{0T}} \right)$$

$R_b < R < R_{\text{knee}}$ as $15 \pm 1\%$, $24 \pm 4\%$, $29 \pm 3\%$ in IC 335, NGC 1380A and NGC 1381 correspondingly.

Изофотный анализ



О сценариях формирования

- Двух этапная сборка галактик
 - бурное формирование *толстого* диска из турбулентной среды на high-z (Elmegreen² 06, Bournaud 09, Elmegreen 17)
 - дальнейшее формирование тонкого диска из газа
 - аккрецирующего из филментов (Sancisi+08, Combes+14) или
 - богатых газом спутников, падающих на галактику (Robertson +16)
 - охлажденный газ аккрецирующий из гало, который некогда был выброшен звездным feedback'ом, галактические фонтаны (Fraternali 09,13)

О сценариях формирования

- Скопление еще собирается (Drinkwater 01, Iodice+17, Spinello +18), но ядро давно собралось - доминируют ETG (Ferguson+89)
- Галактики были подвержены эффектам плотного окружения скопления (Boselli & Gavazzi 06):
 - ram pressure stripping
 - tidal interactions with cluster potential and flybys
 - starvation

Fornax Galaxy Cluster

NGC 1380

NGC 1382

NGC 1381

NGC 1399

NGC 1379

NGC 1427A

NGC 1387

NGC 1404

NGC 1389

NGC 1365

