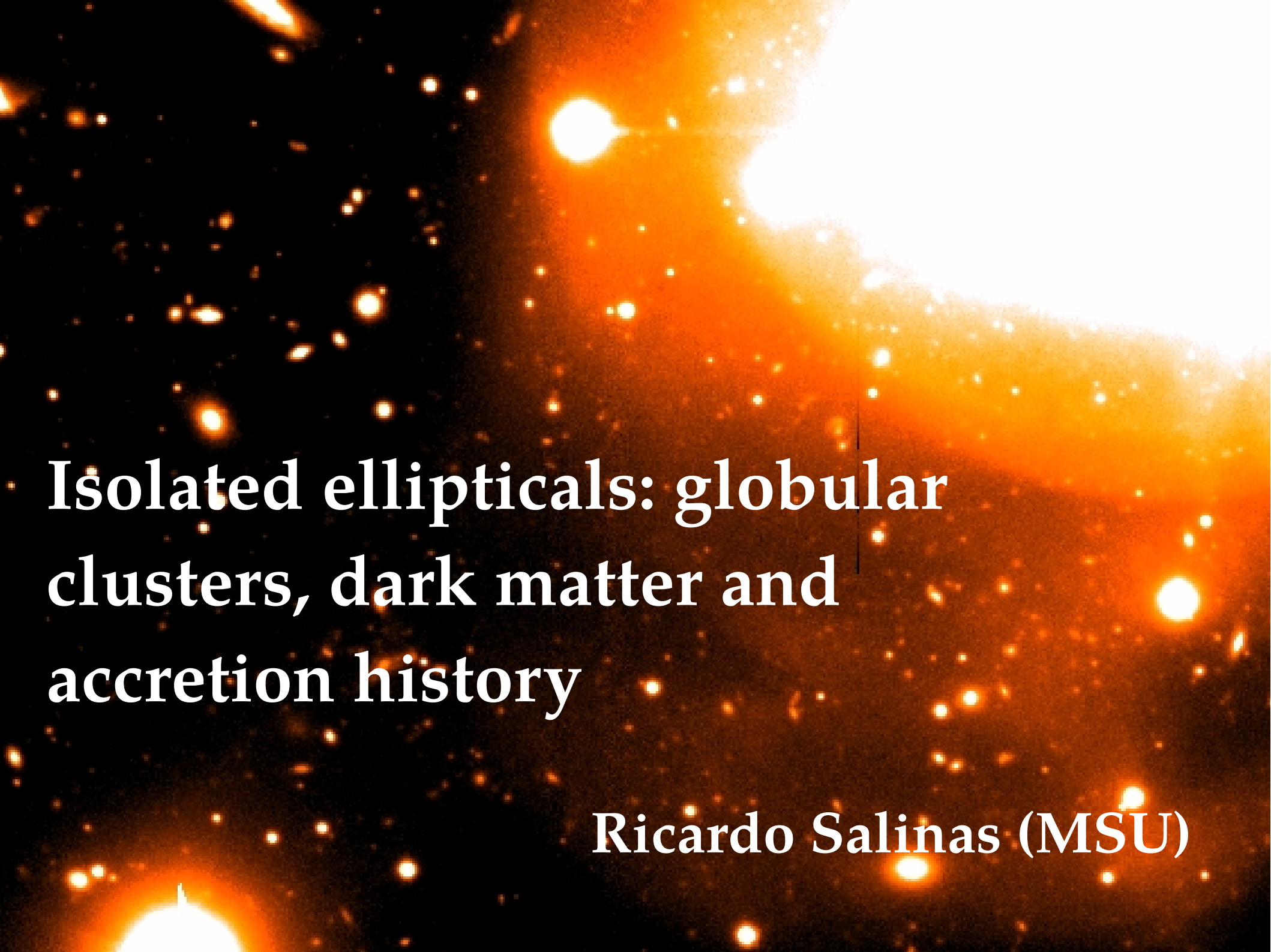


Isolated ellipticals: globular clusters, dark matter and accretion history

Ricardo Salinas (MSU)

Collaborators:

Tom Richtler and Richard Lane (U Concepción)

Salinas, Richtler, Bassino et al. 2012, A&A, 538, A87
Lane, Salinas & Richtler, 2013, A&A, 549, A148
Richtler, Salinas, Lane et al. 2015, A&A, 574, A21
Lane, Salinas & Richtler, 2015, A&A, 574, A93
Salinas, Alabi, Richtler & Lane 2015, A&A, 577, A59
Richtler et al. in preparation

Outline

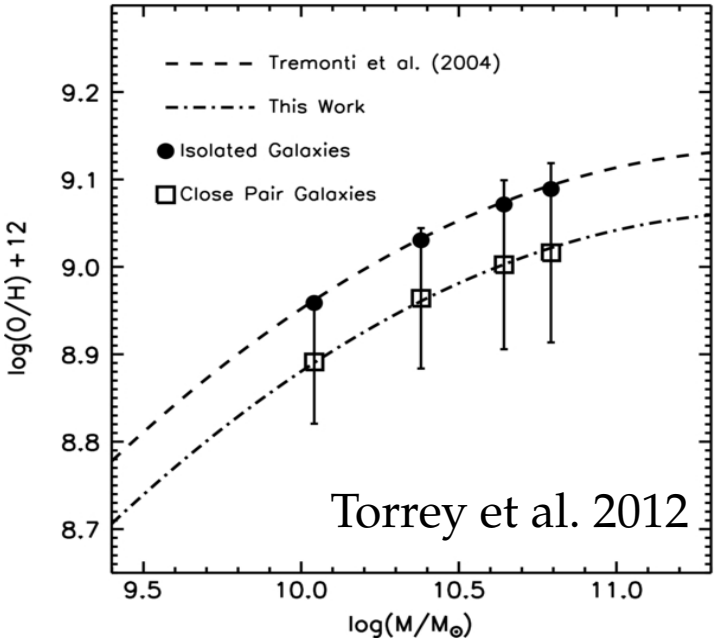
Why isolated elliptical galaxies?

Globular cluster systems in IEGs

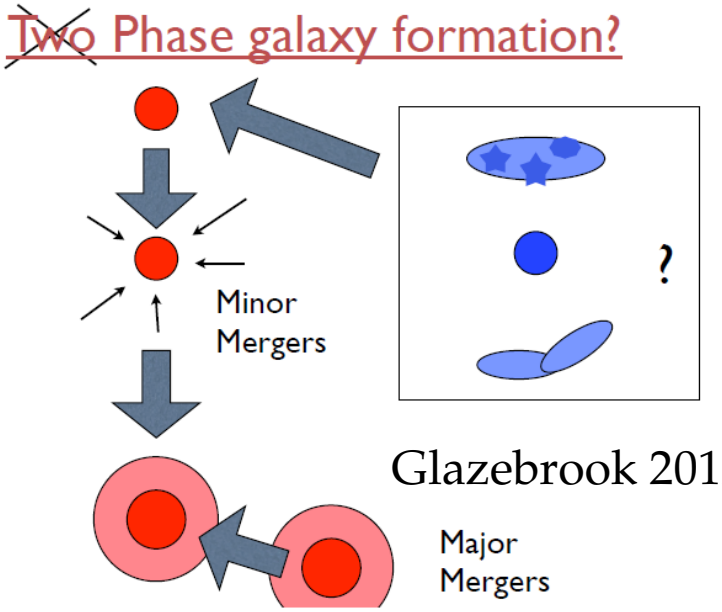
Dark matter in IEGs

Accretion signatures

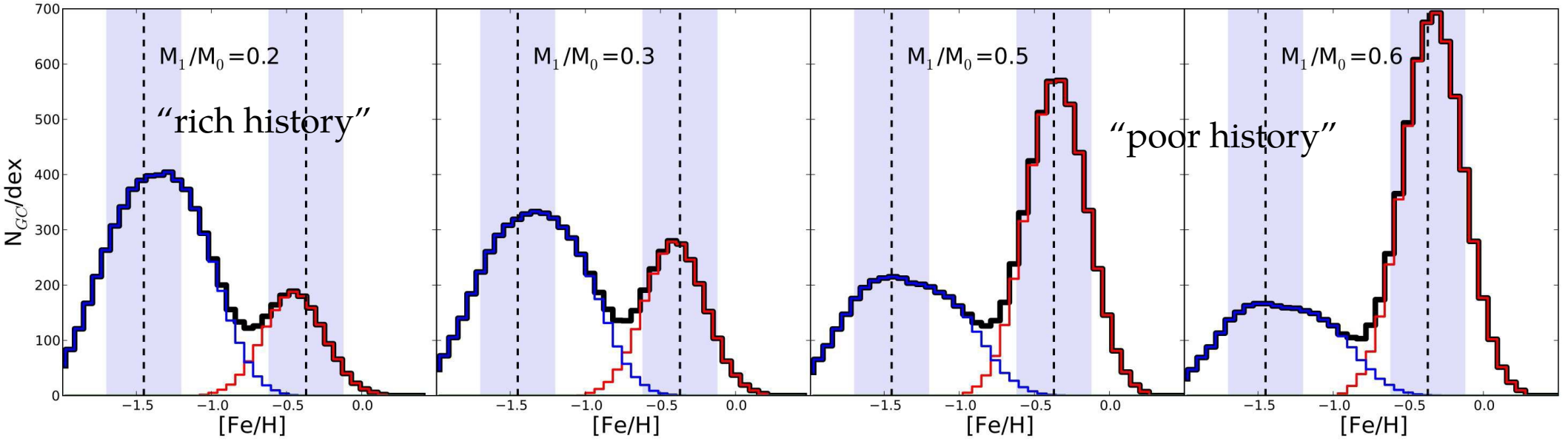
Isolated ellipticals: globular cluster systems



Torrey et al. 2012

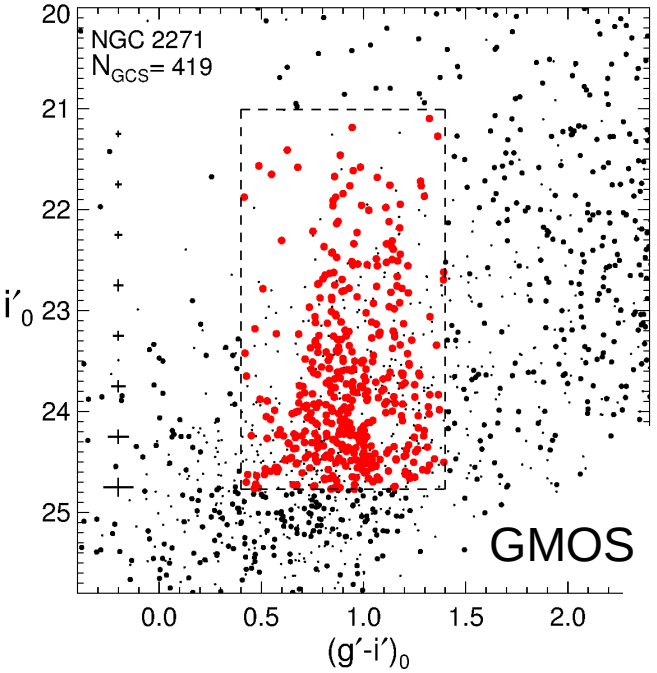


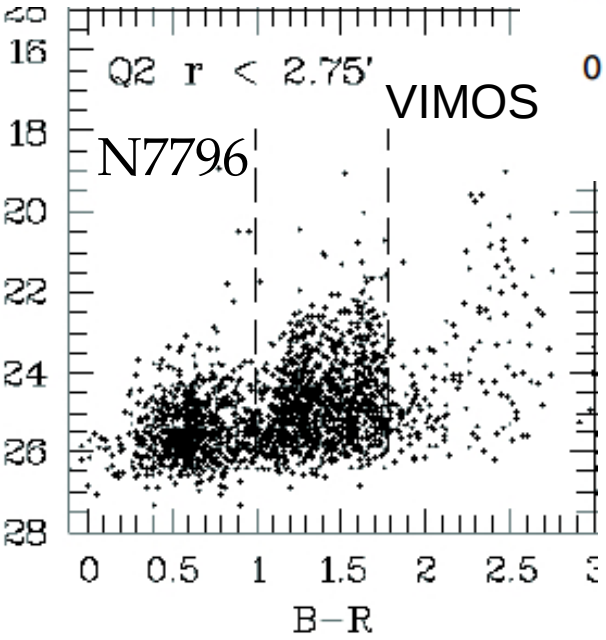
Glazebrook 2012

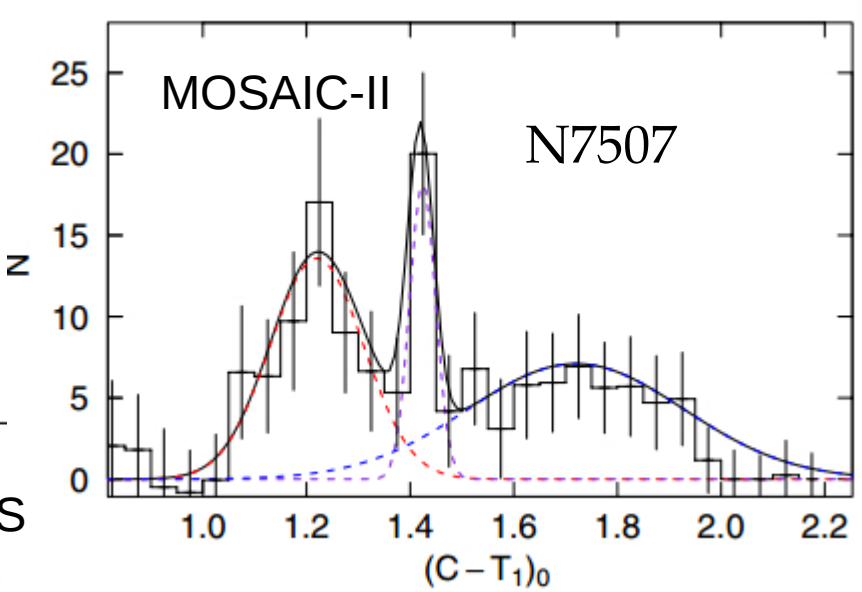


Tonini 2013

Isolated ellipticals: globular cluster systems

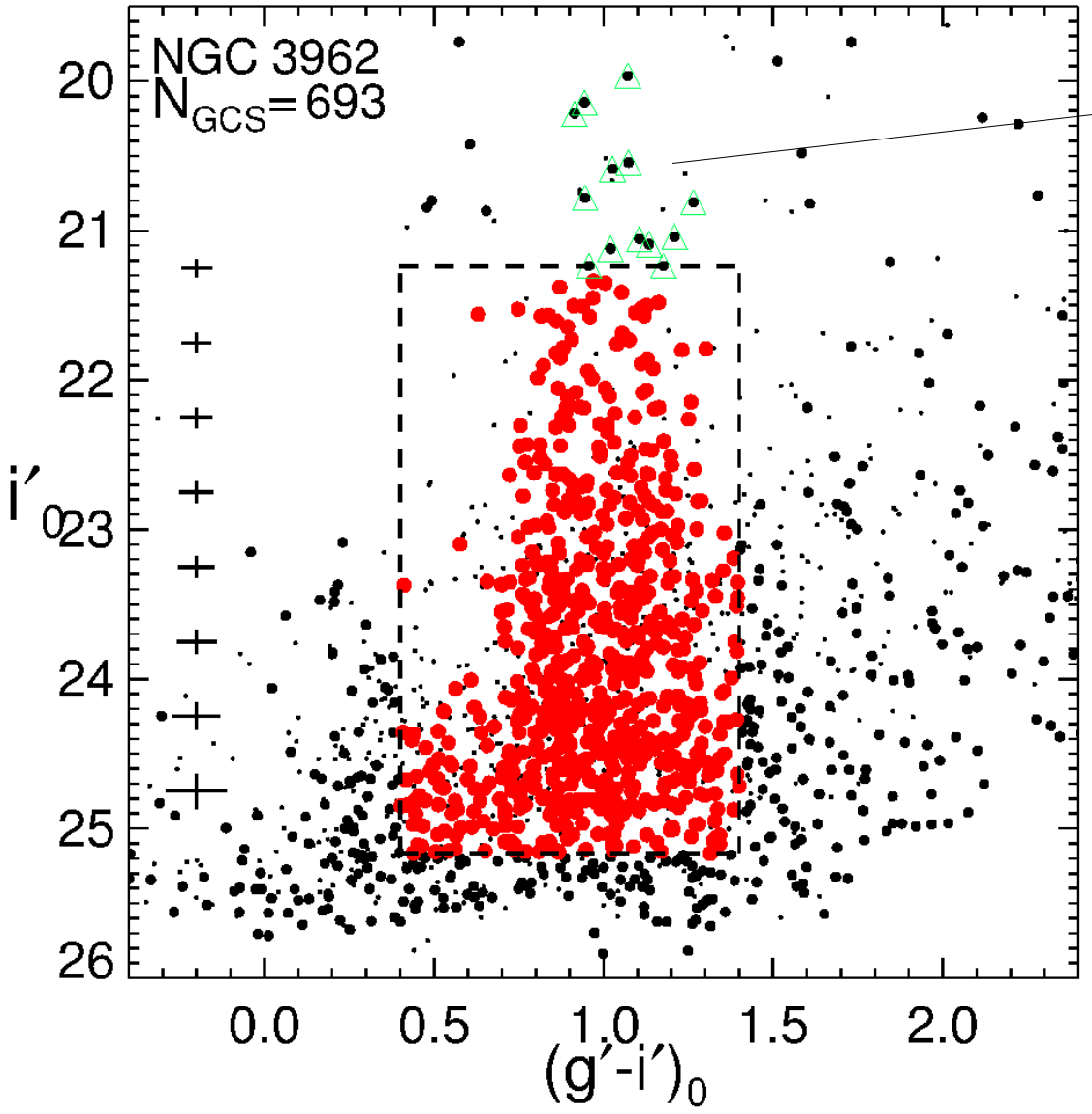






NGC 3585, NGC 5812 (Lane, Salinas & Richtler 2013), NGC 7507 (Caso et al. 2013), NGC 3962, NGC 2271, NGC2865, NGC 4240, IC4889 (Salinas et al. 2015), NGC 7796 (Richtler et al. 2015)

Isolated ellipticals: globular cluster systems



Salinas et al. 2015

Ultra-compact dwarfs?

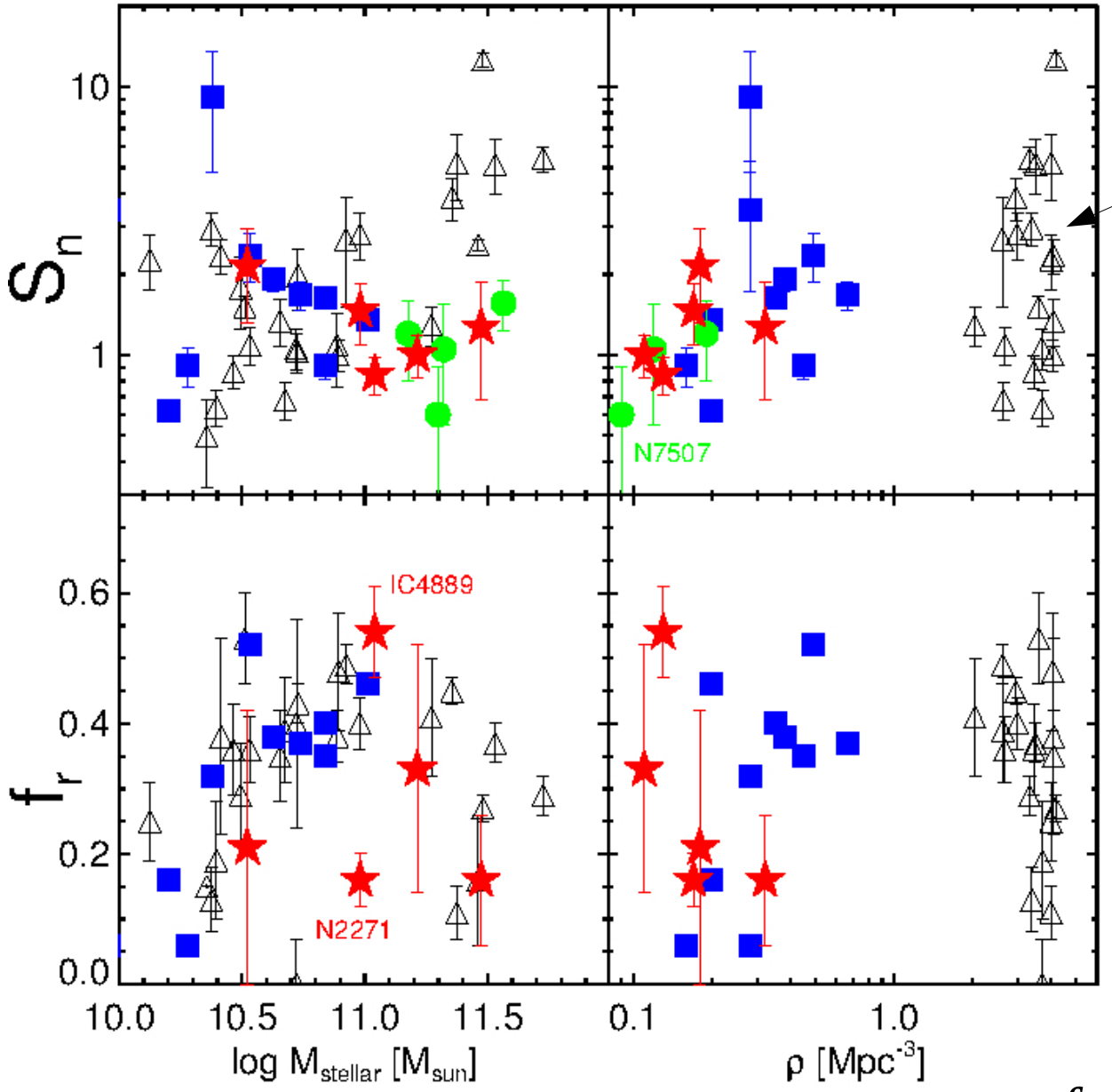
Relatively rich and well-defined GCS

Not bimodal?

Follow-up HAWK-I and VIMOS imaging

GS2015A-Q-10: DM + UCDs

Isolated ellipticals: globular cluster systems



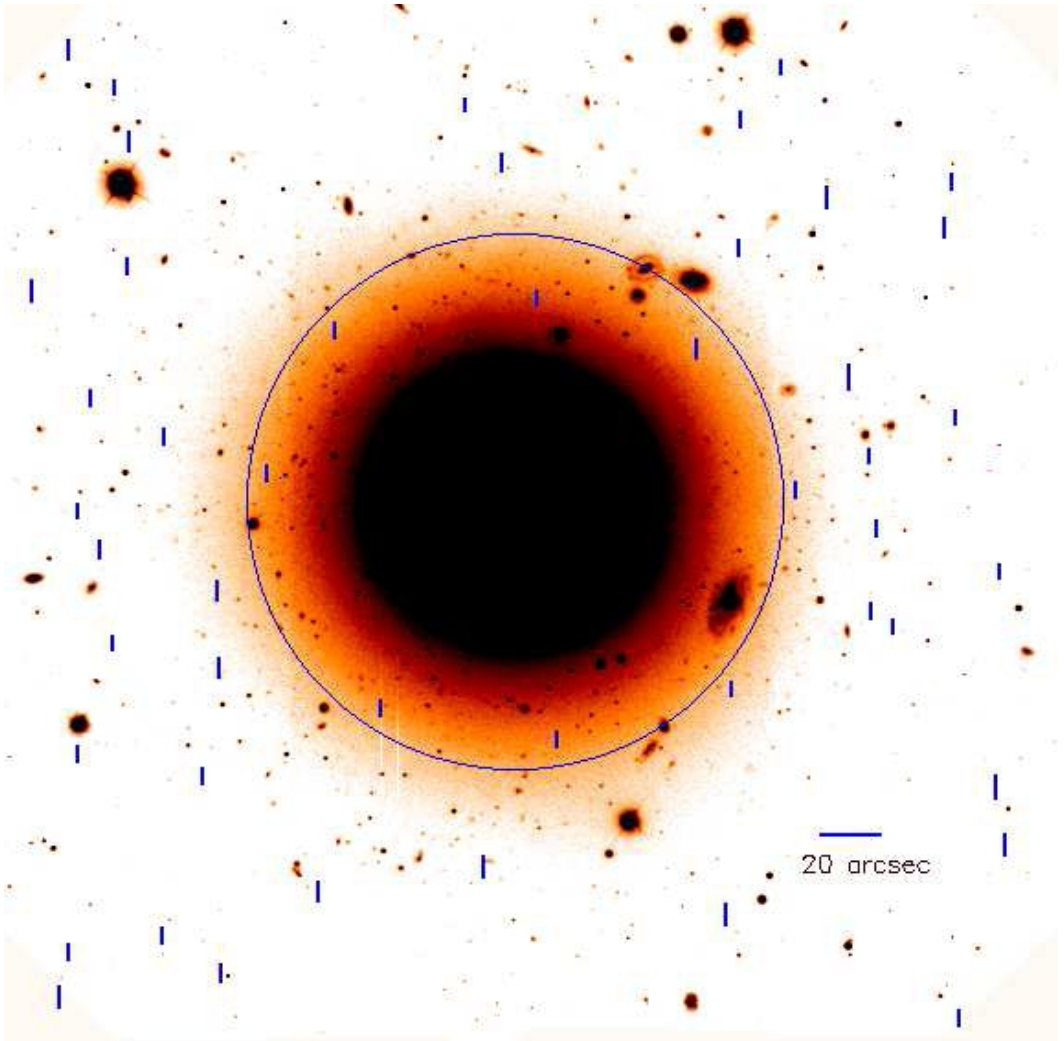
Salinas et al. 2015

$$S_n = N_{GC}\, 10^{(0.4(M_V+15))}$$

$$f_r = N_r / N_{GCS}$$

Isolated ellipticals: dark matter

NGC 7507



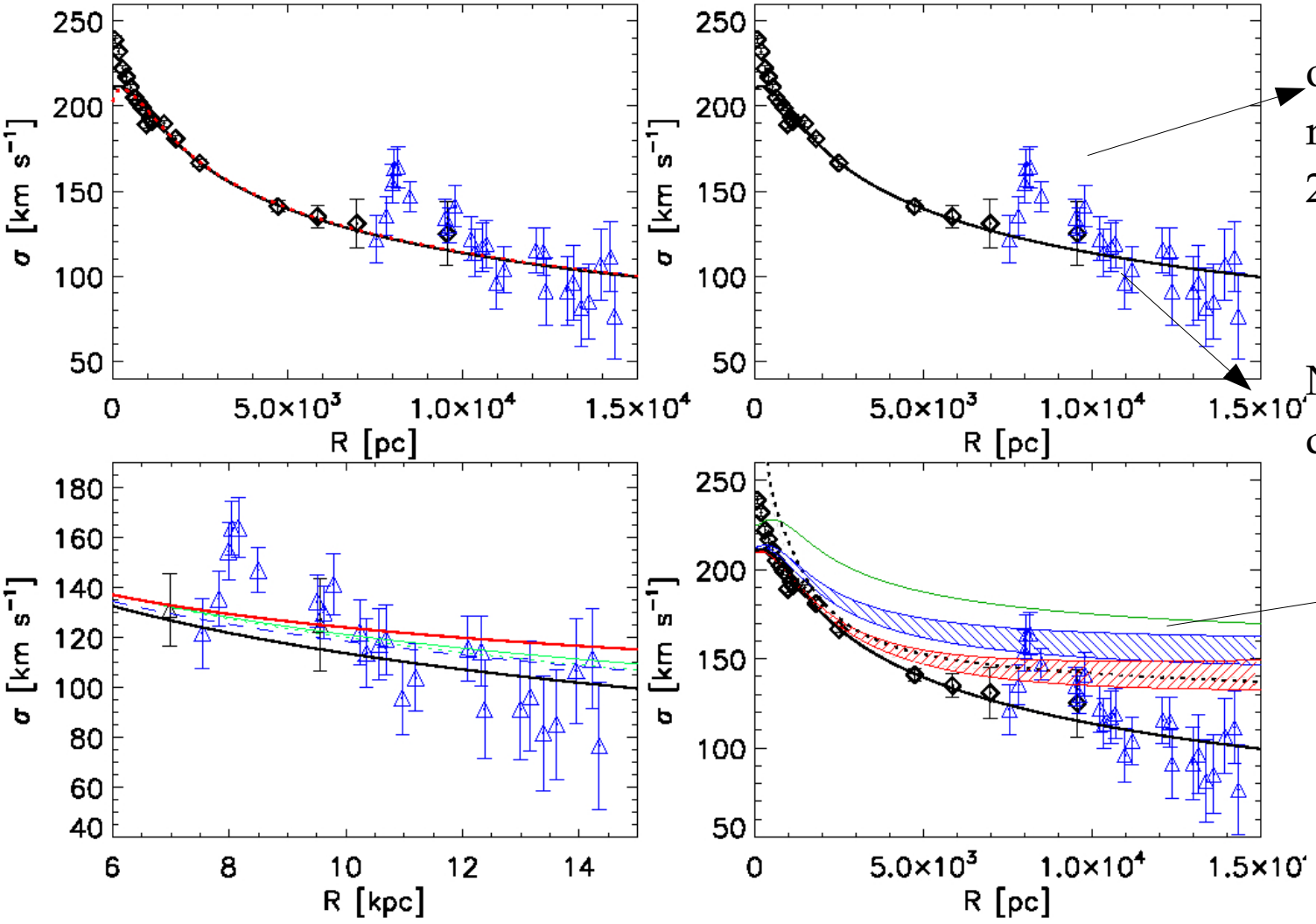
Gemini/GMOS: 1.5h long slit + 3.5 hour mask

Salinas et al. 2012; Lane, Salinas & Richtler 2015

Isolated ellipticals: dark matter

Jeans modelling

NGC 7507



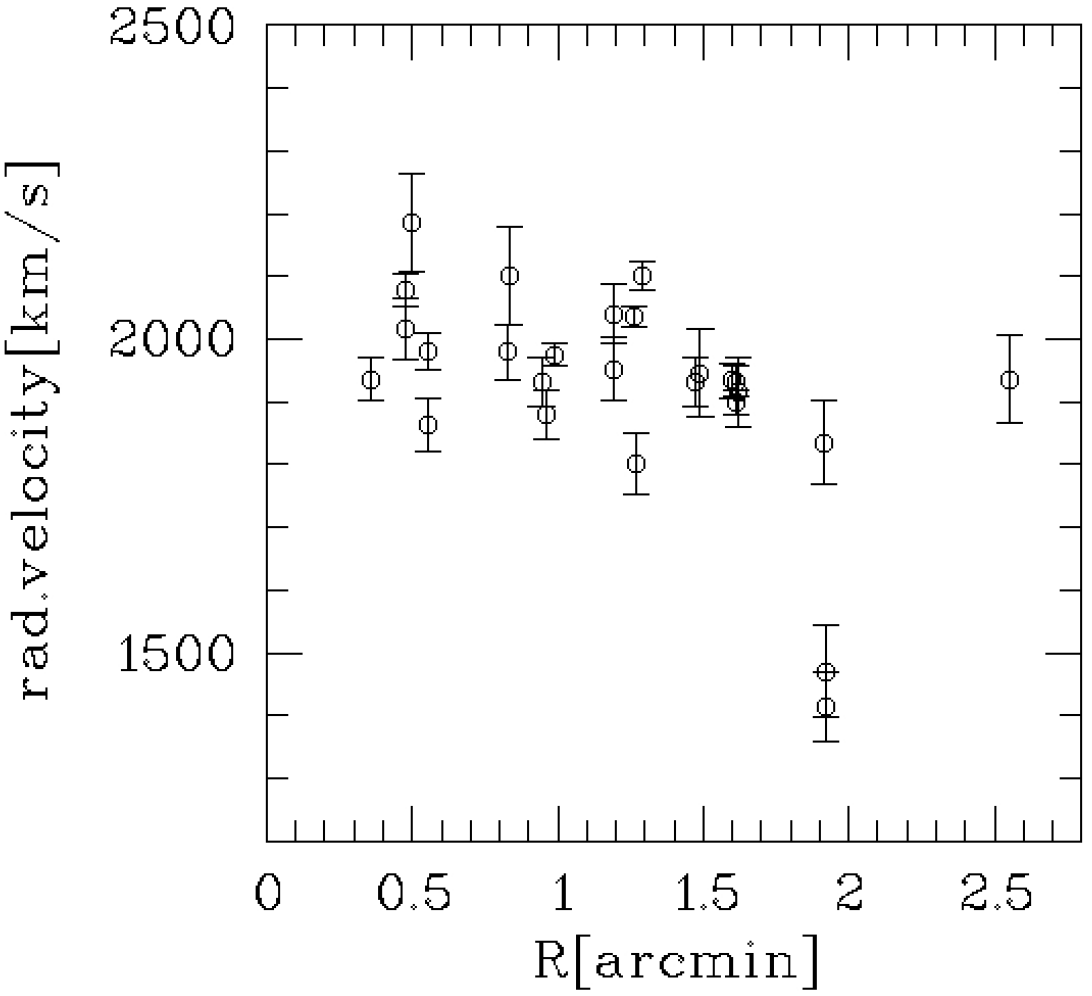
σ bump: sign of past merger (Schauer et al. 2014)

No DM model is excellent description.

MOND suffers!

Salinas et al. 2012; Lane, Salinas & Richtler 2015

Isolated ellipticals: dark matter



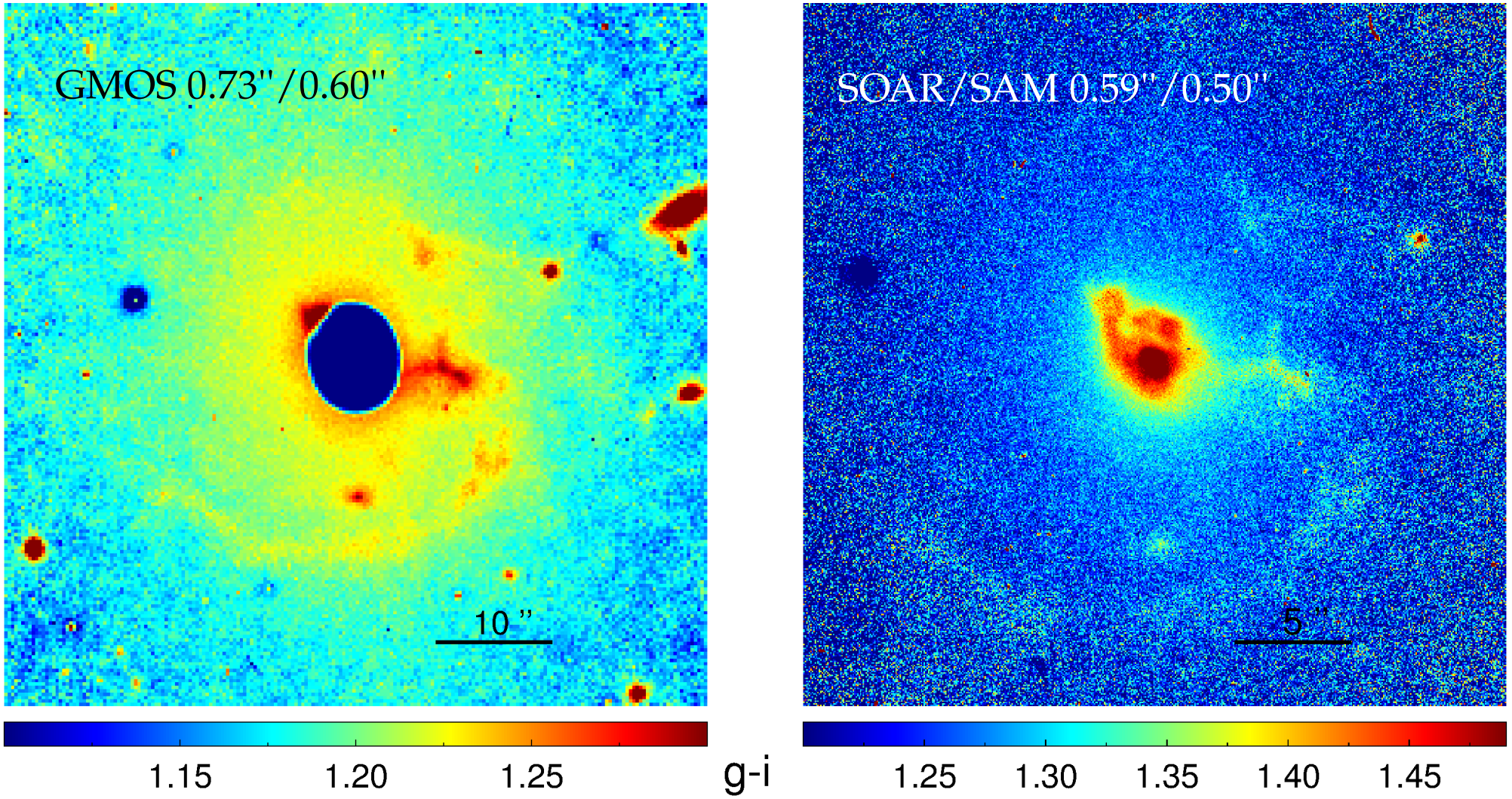
NGC 5812
(GS-2014B-Q-25)

24 GCs:
σ~95 km/s

GS-2015B-Q-21:
NGC 7796

Richtler et al. in prep

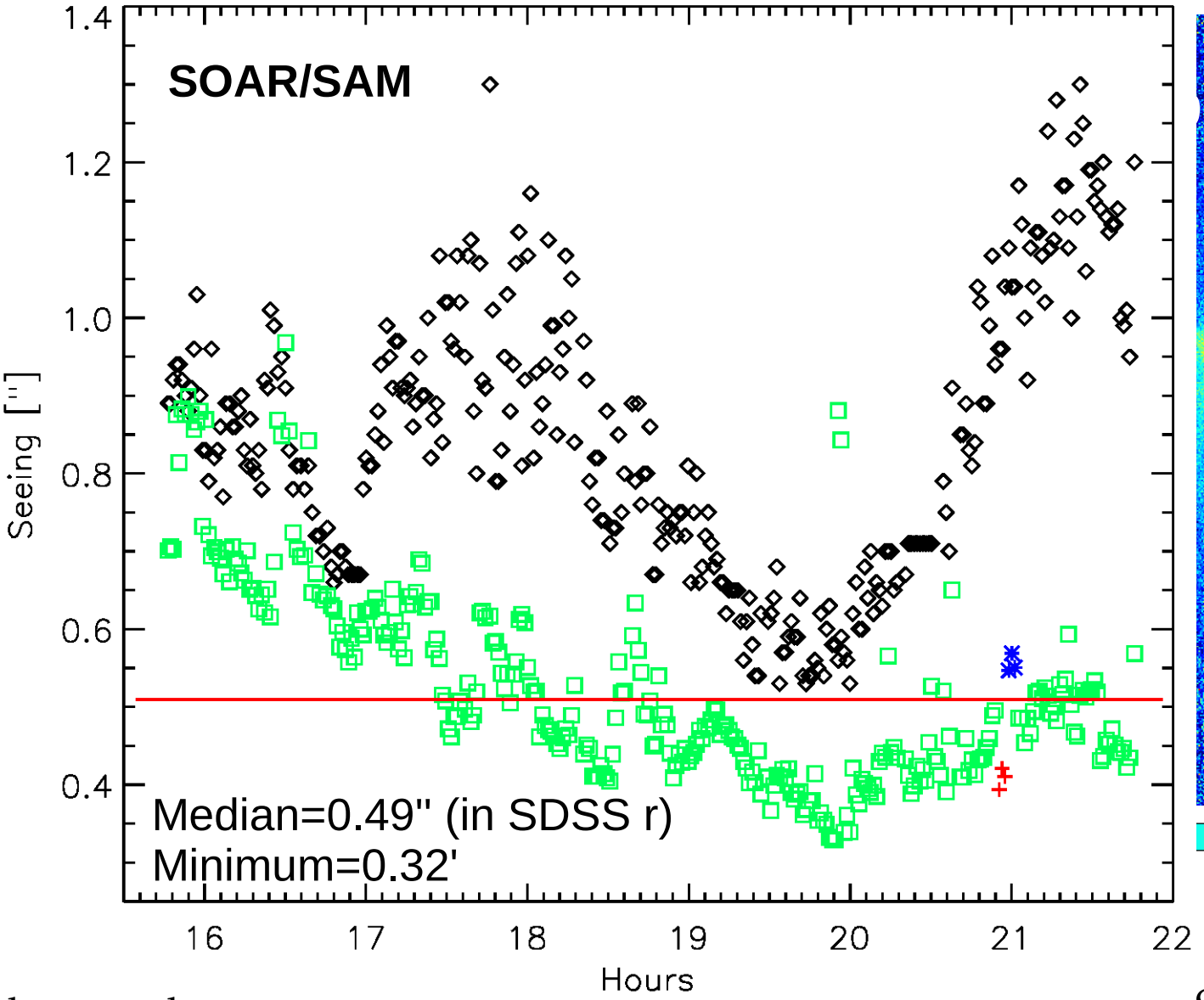
Isolated ellipticals: accretion signatures



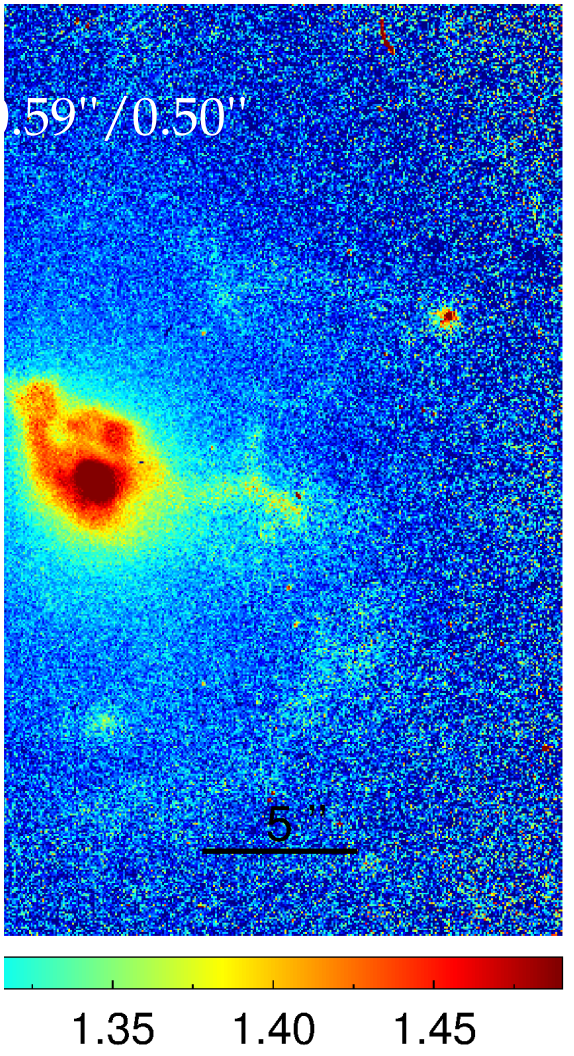
NGC 3962

Salinas et al. 2015

Isolated ellipticals: accretion signatures

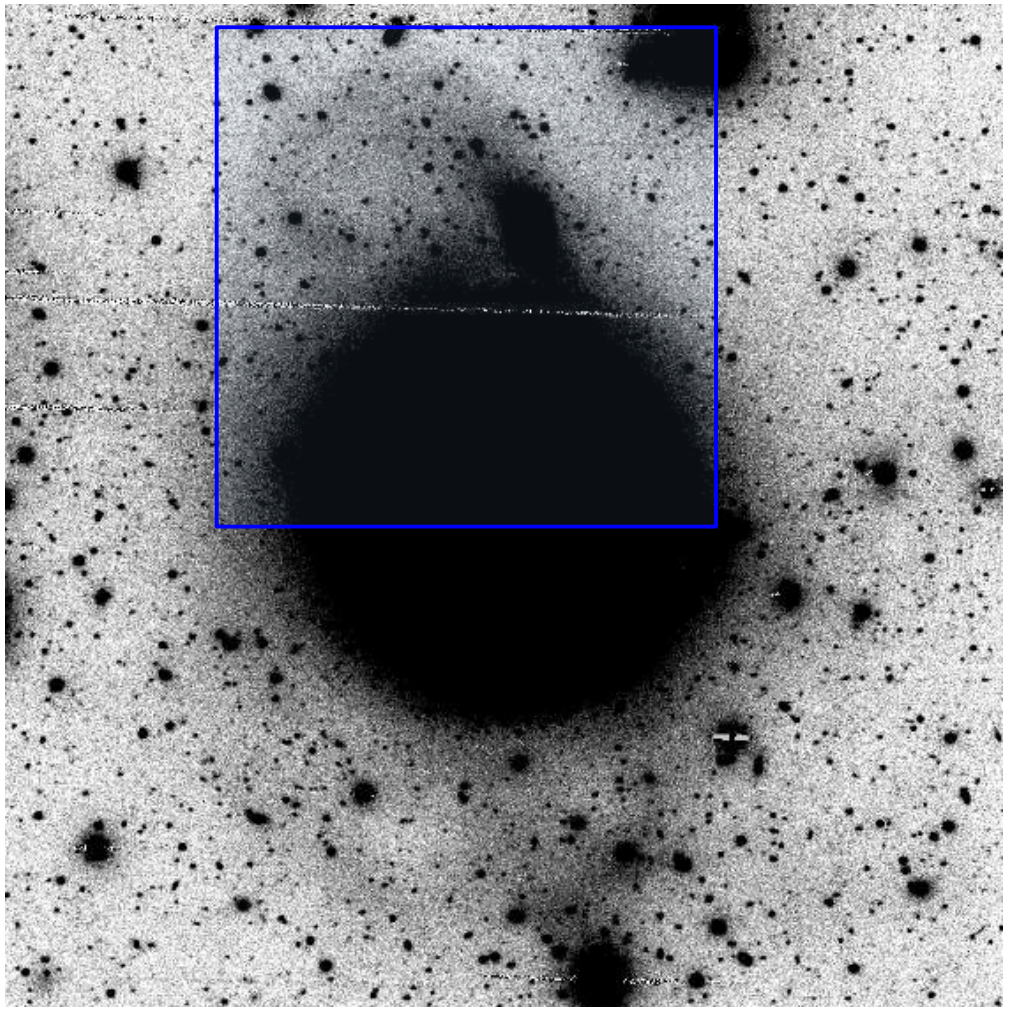


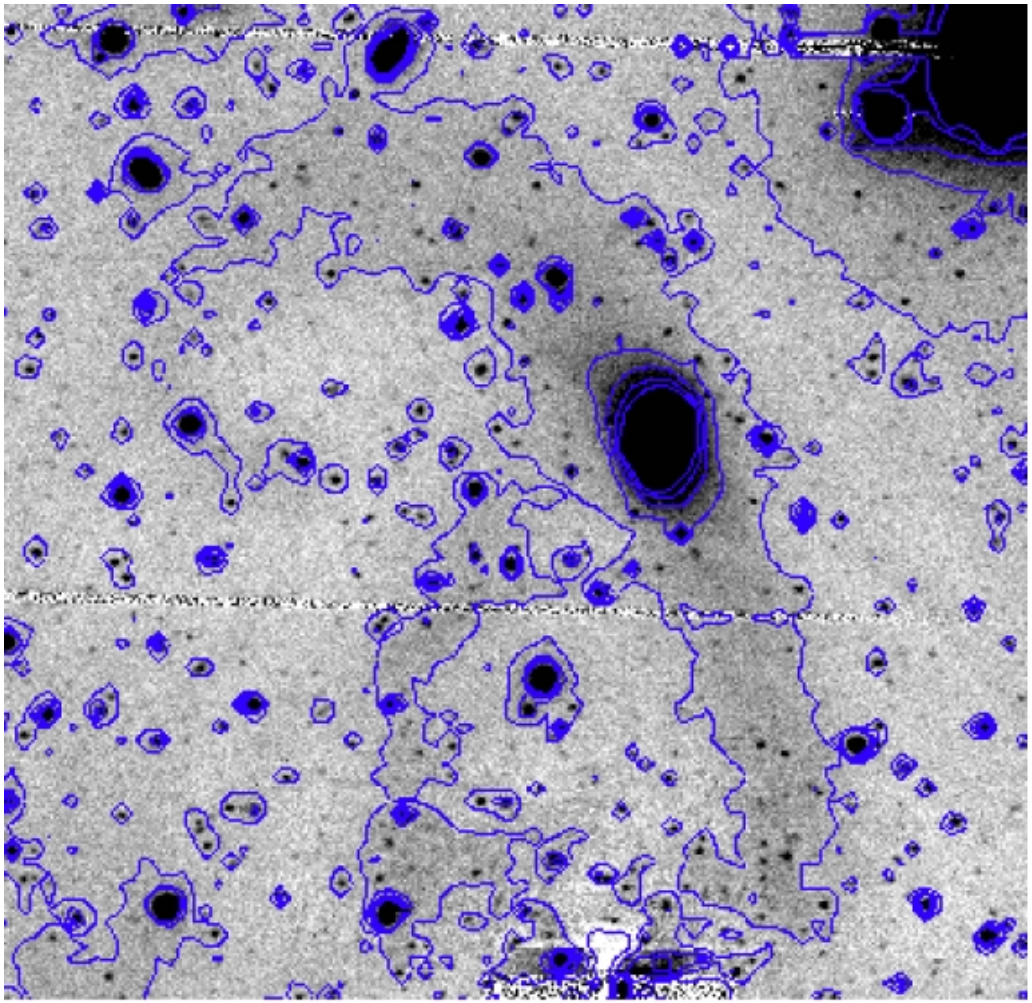
Salinas et al. in prep



Salinas et al. 2015

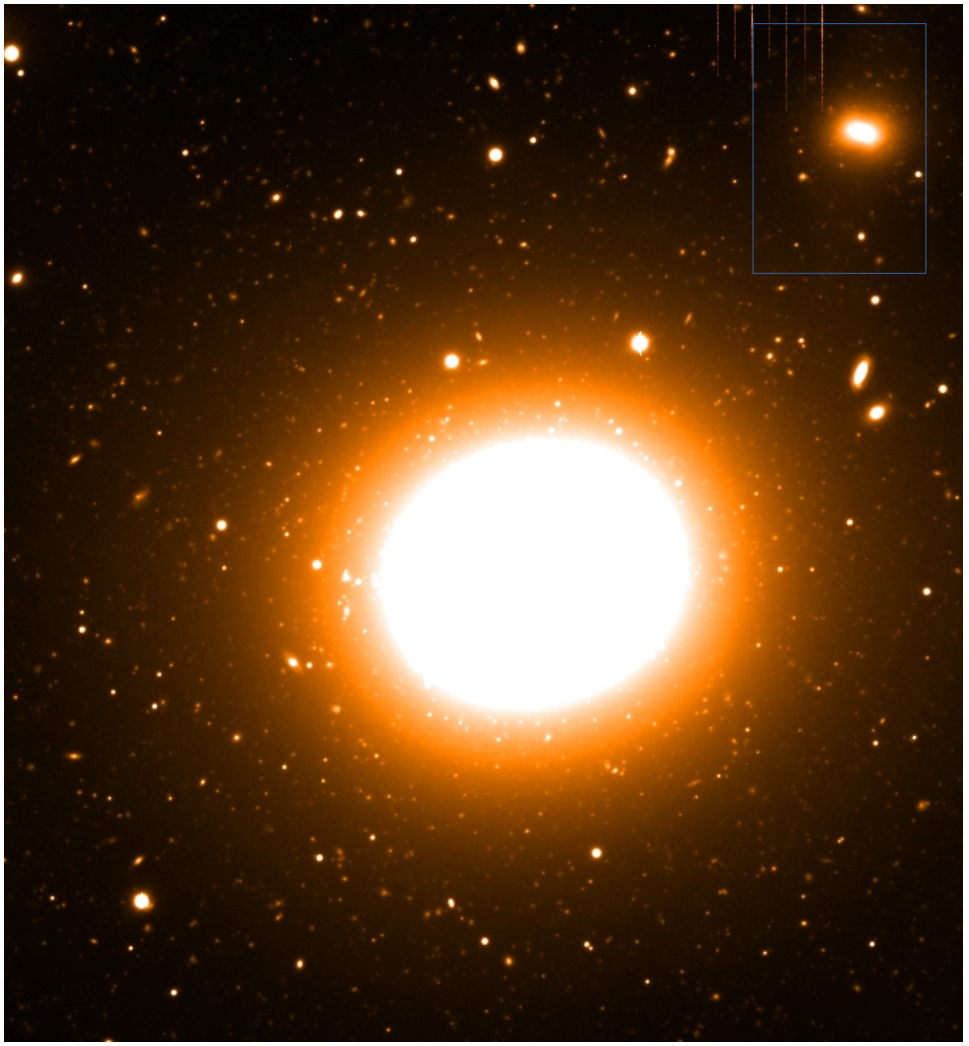
Isolated ellipticals: accretion signatures



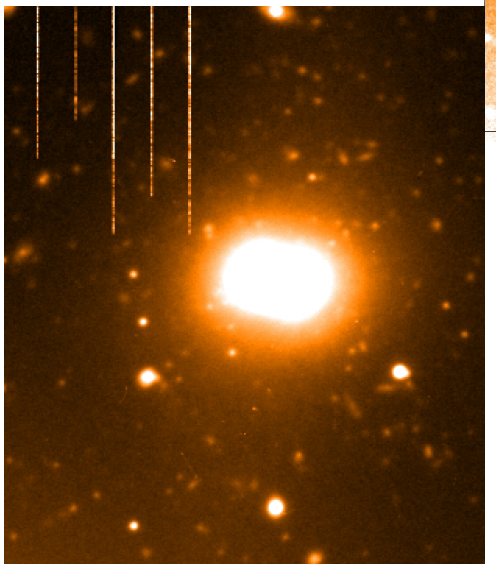


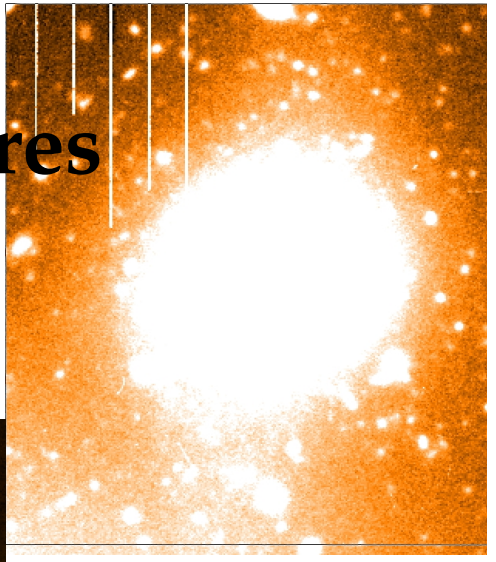
NGC 5812 (Lane, Salinas & Richtler 2013)

Isolated ellipticals: accretion signatures

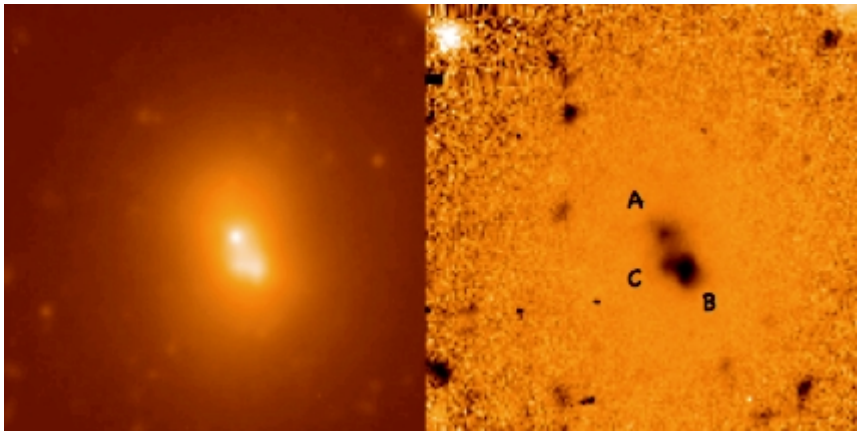


NGC 7796 (Richtler, Salinas, Lane et al. 2015)



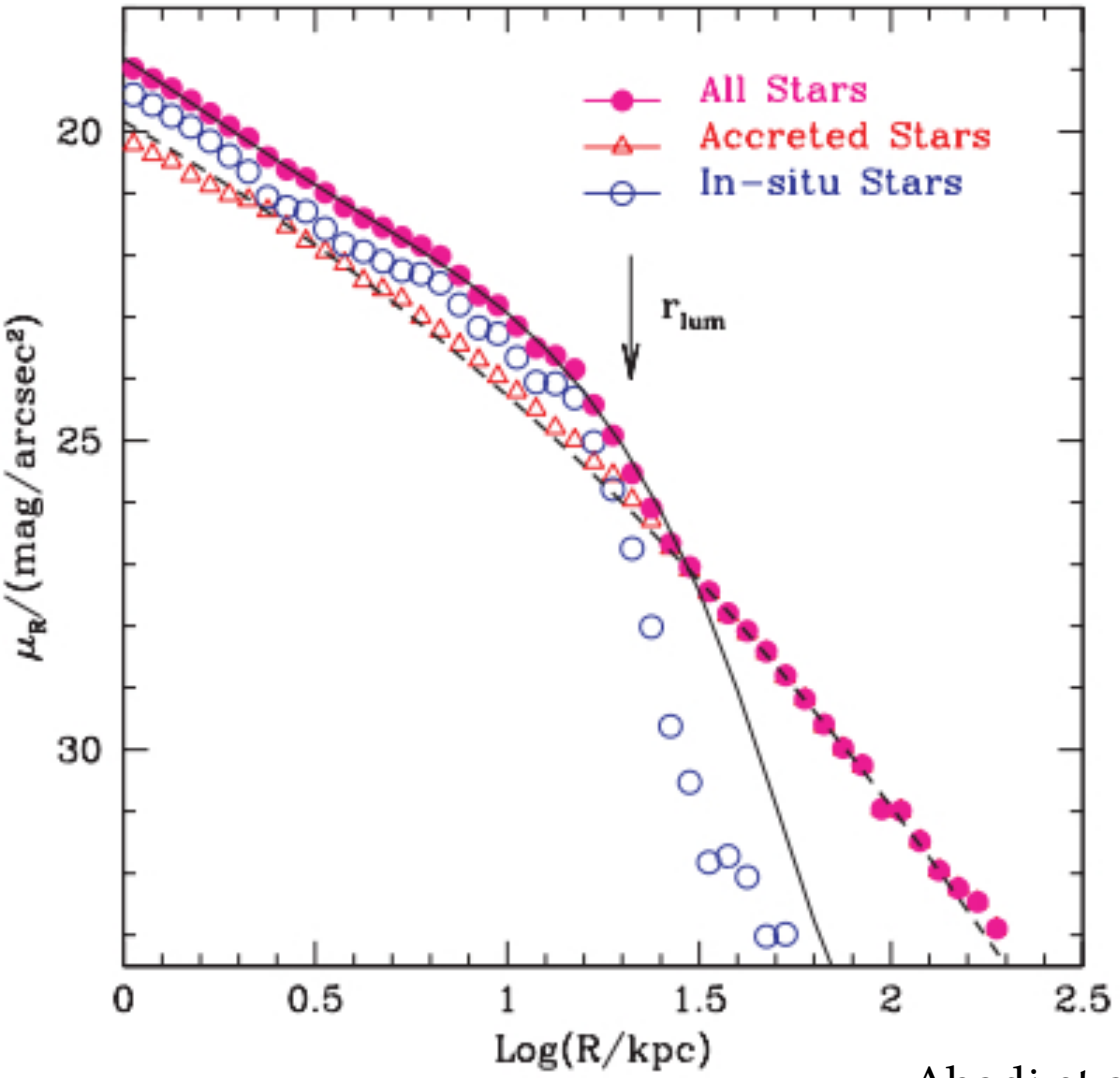


Boxy. Equal mass merger? (Khochfar & Burkert 2005)



Three nuclei? (2 hours in MUSE SV)

Isolated ellipticals: forever alone?



Abadi et al. 2006

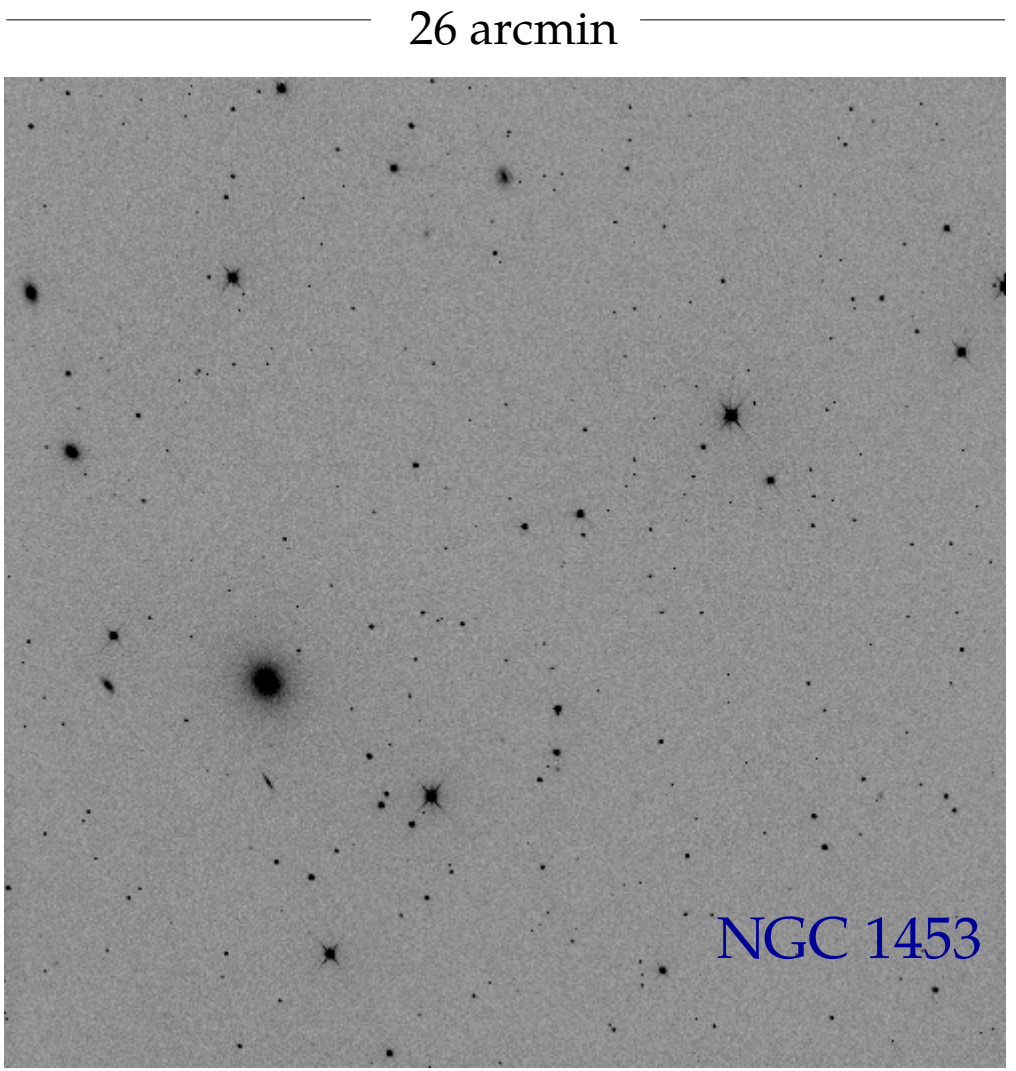
Isolated ellipticals: forever alone?

40 hours with LCOGT (2014B)
8 galaxies

Pros: Large FOV, N & S hemispheres

Cons: Automatic reduction

- Look for hidden companions
- Accretion signatures
- Isophotal parameters
- Accurate stellar mass profiles



Summary and outlook

- Red fractions are equal or lower than in galaxy cluster ellipticals, at odds with the predictions of Tonini et al. (2013)
- Specific frequencies are also lower than in cluster environments
- Dark matter on isolated Es *could* be lower than expected
- How rich was the accretion history of isolated Es?