Approaching unknown SFHs

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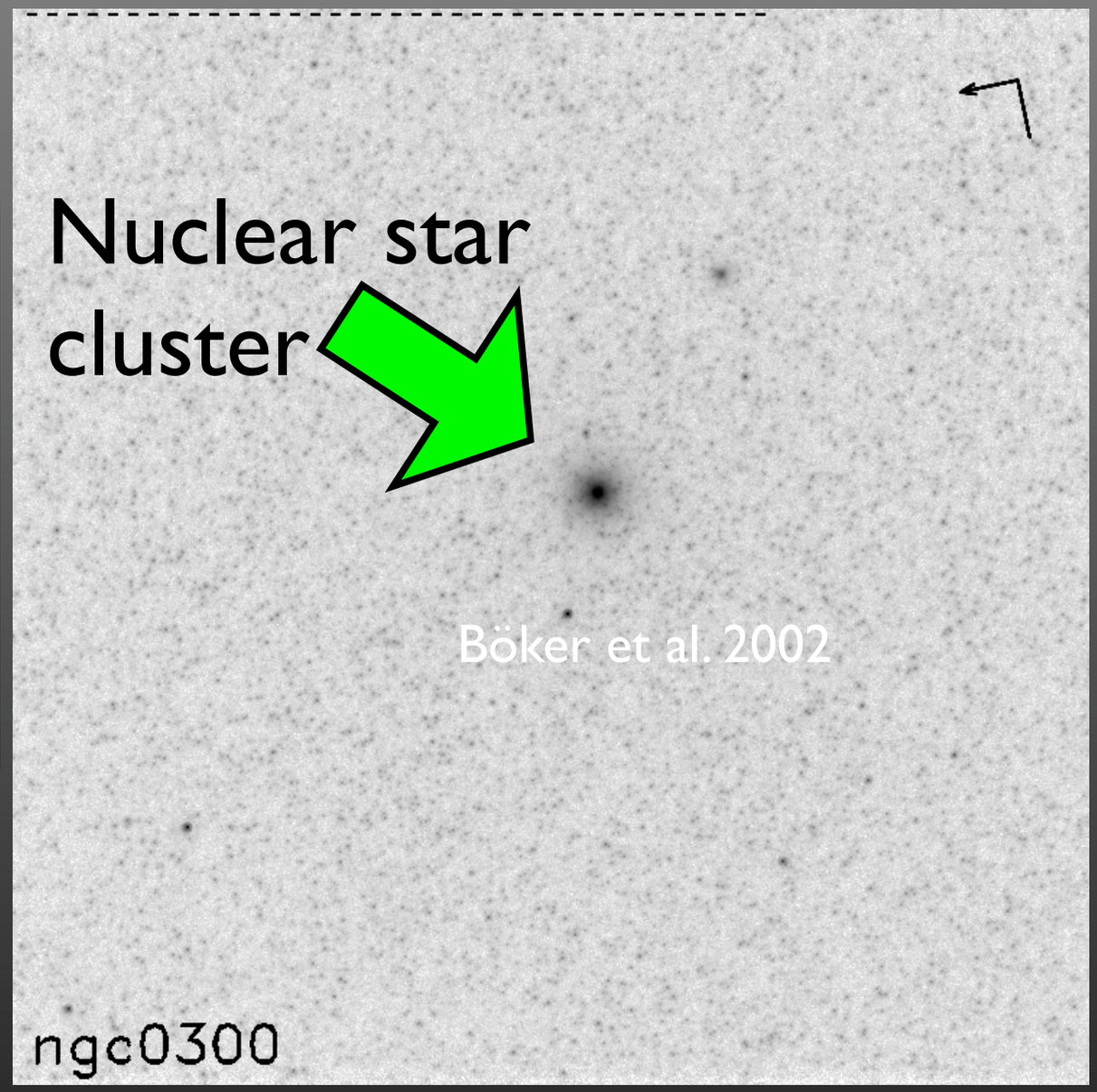
Nuclear star clusters

Typical properties:

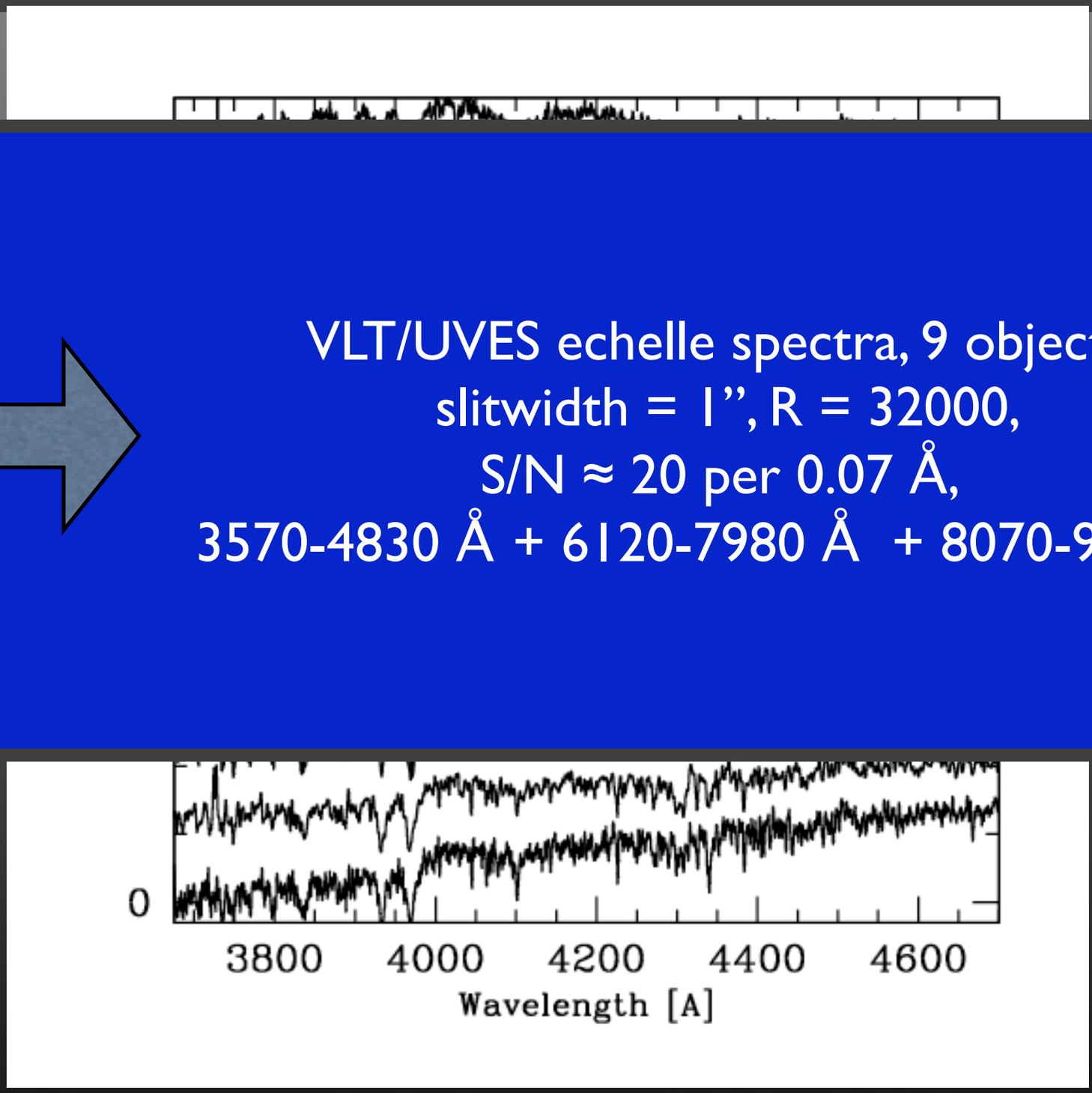
- in photometric center
- most luminous cluster by 2 mag
- M_I = -11.5 ±4 mag
- m_I = 14-19.5 mag
- r~5pc



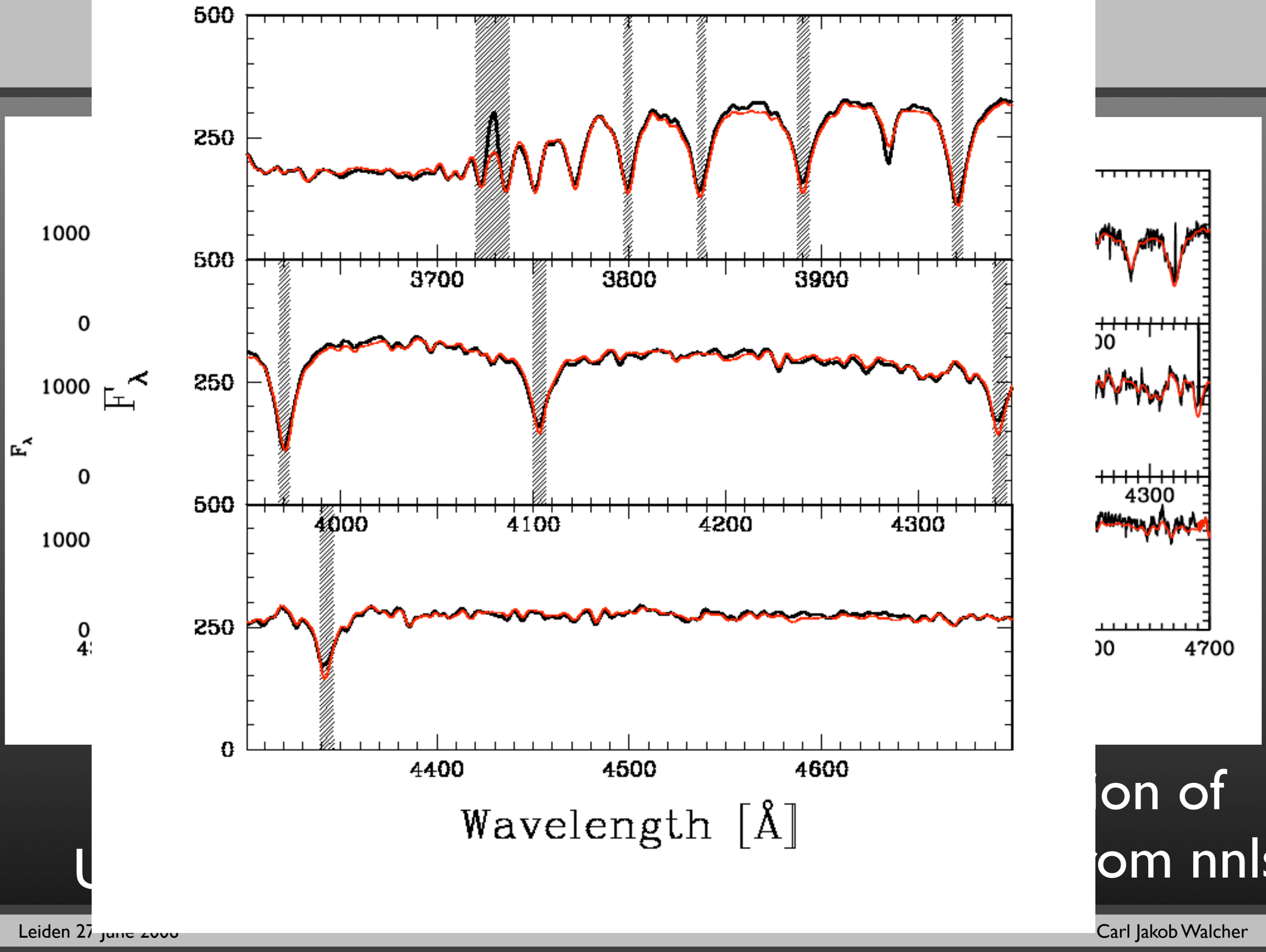
Böker et al. 2002

just some kind of globular??

get spectra...



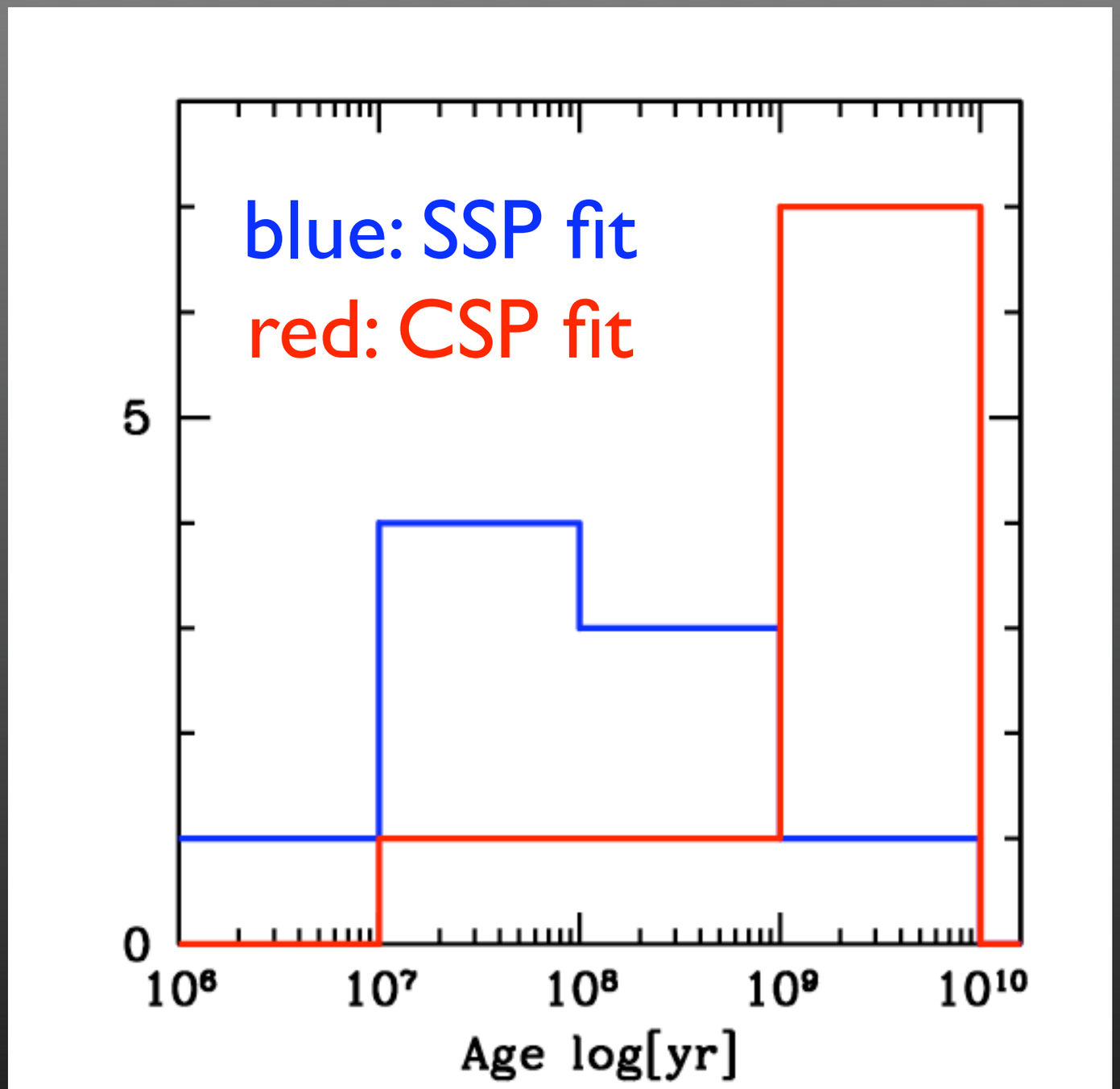
VLT/UVES echelle spectra, 9 objects
slitwidth = 1”, R = 32000,
S/N ≈ 20 per 0.07 Å,
3570-4830 Å + 6120-7980 Å + 8070-9920 Å


NGC 7793
500
250
500
3700
3800
3900
1000
0
1000
250
500
4000
4100
4200
4300
1000
250
0
4400
4500
4600
Wavelength [Å]
4300
4700

on of

om nnls

Age Distribution



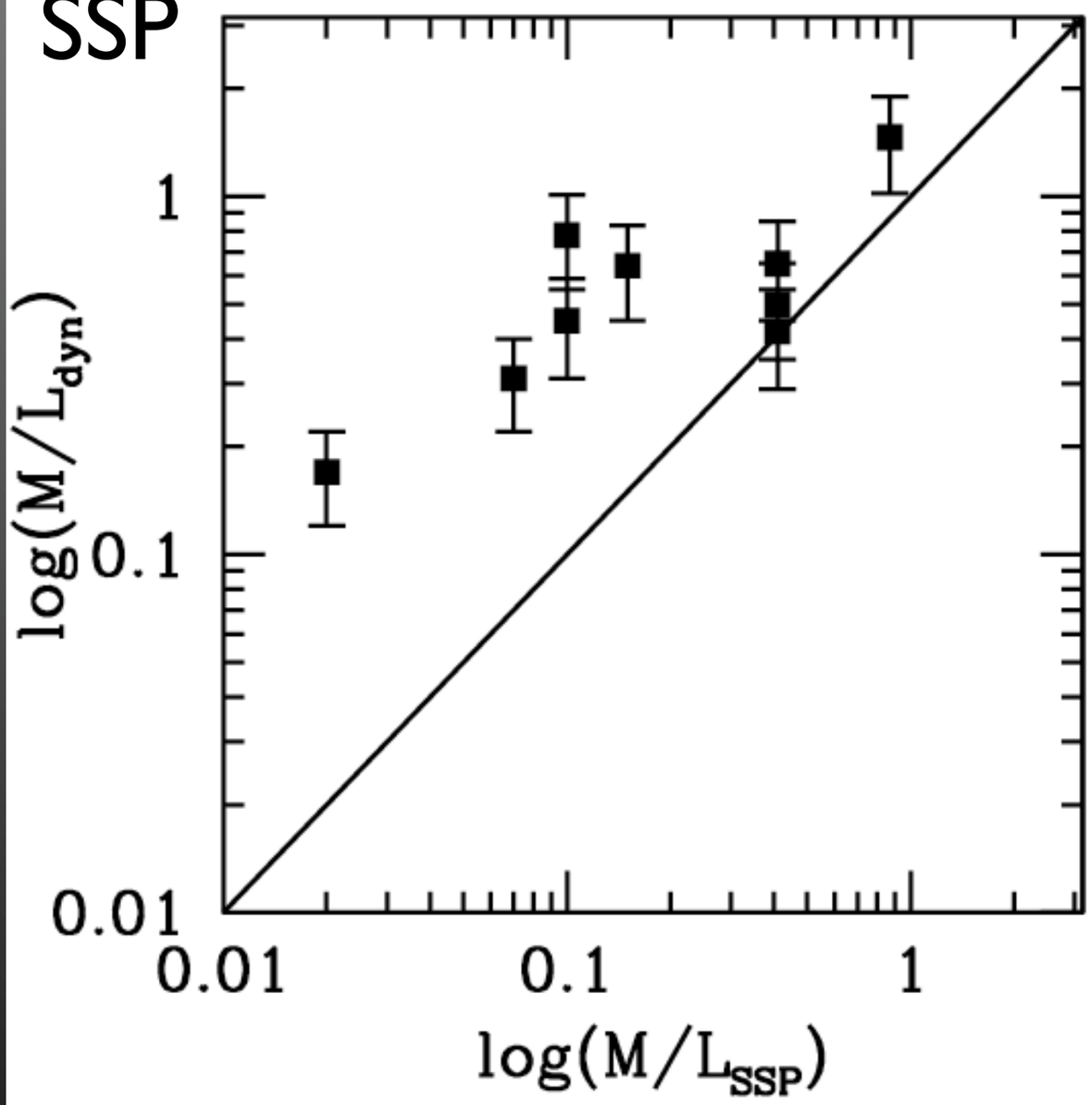
Mean lightweighted age depends strongly on method!

SSP: 1×10^8 yr

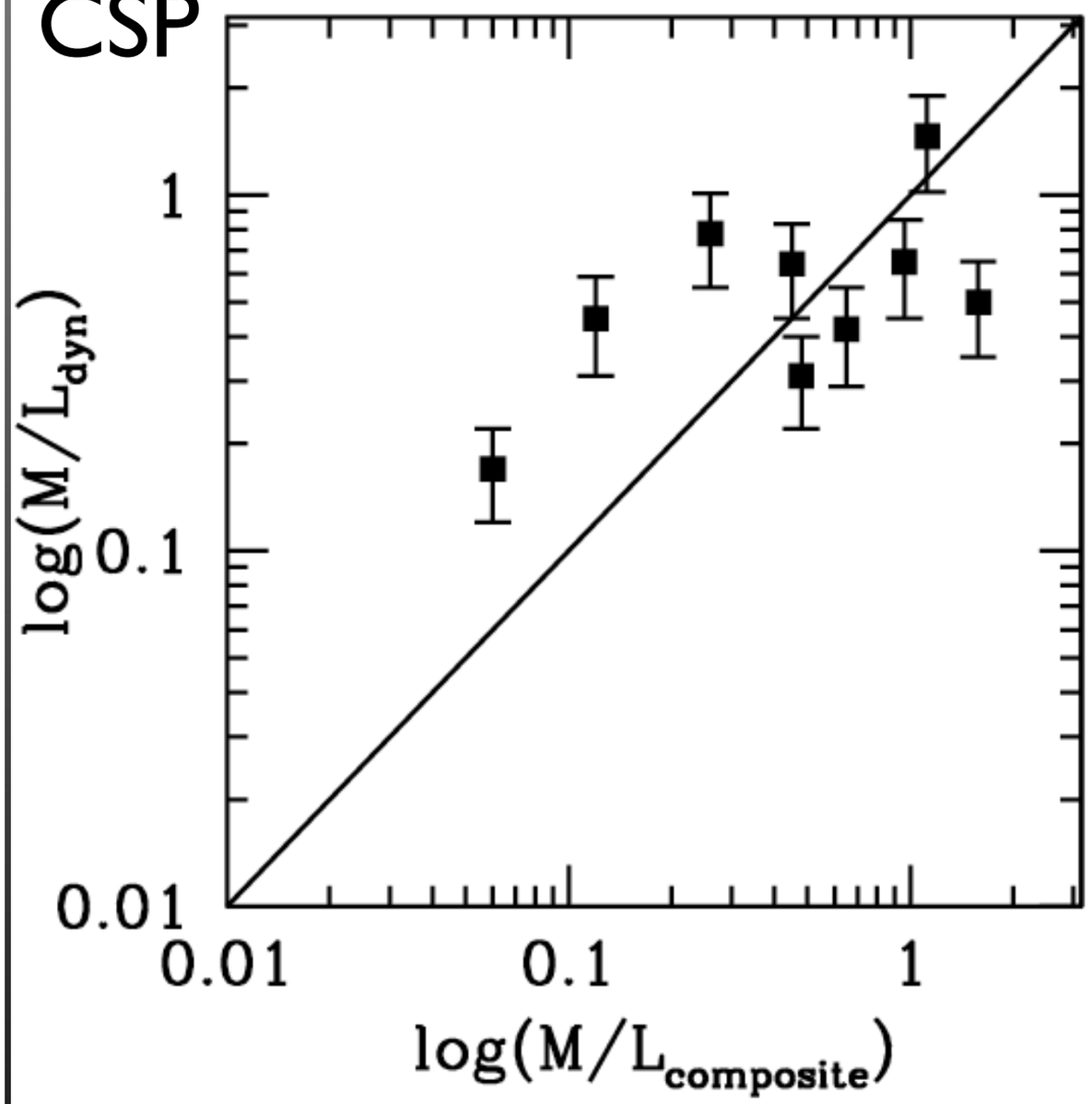
CSP: $1\text{-}5 \times 10^9$ yr

M/L

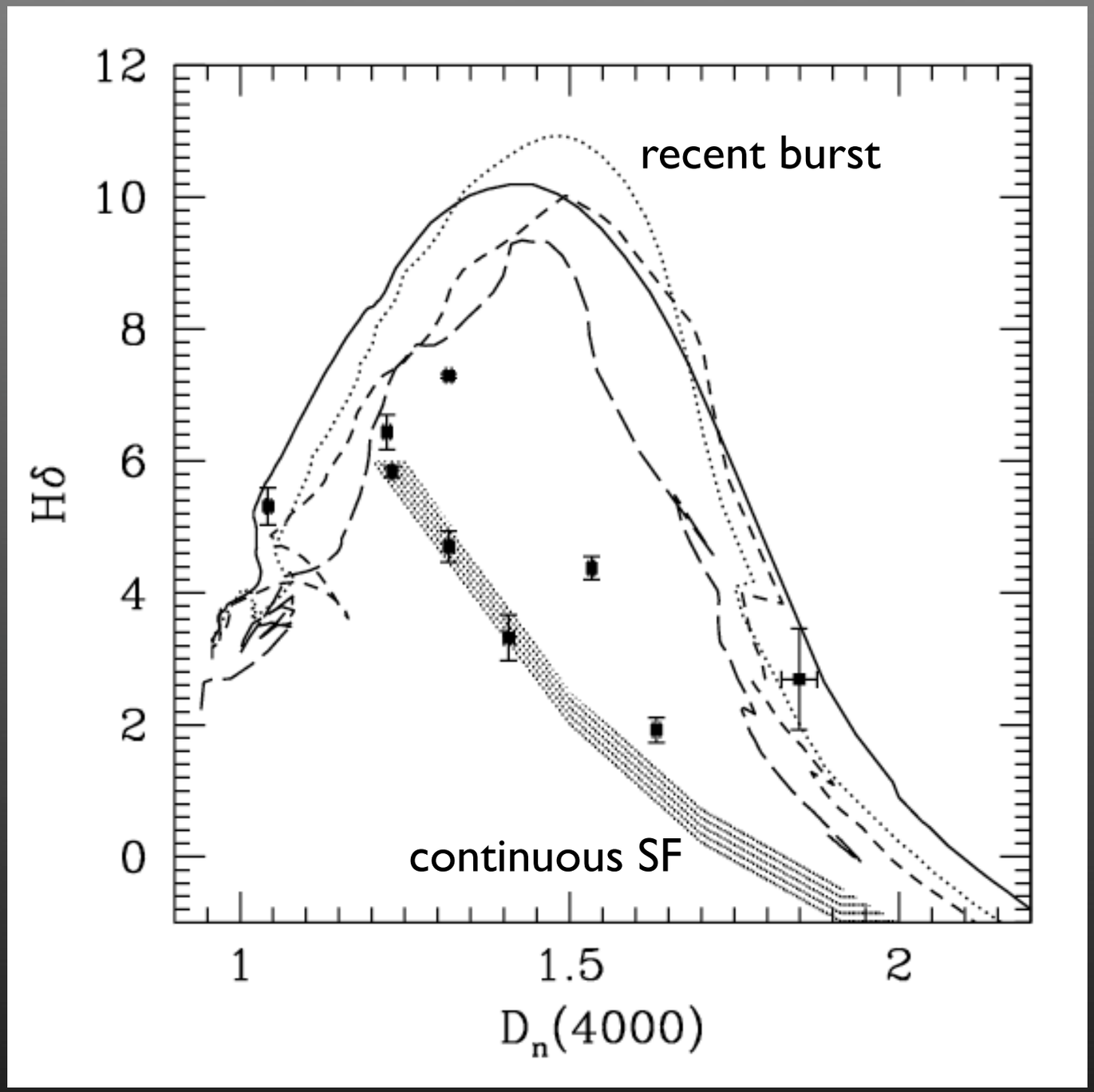
SSP


1
0.1
0.01
0.01
0.1
1
log(M/L_dyn)
log(M/L_SSP)

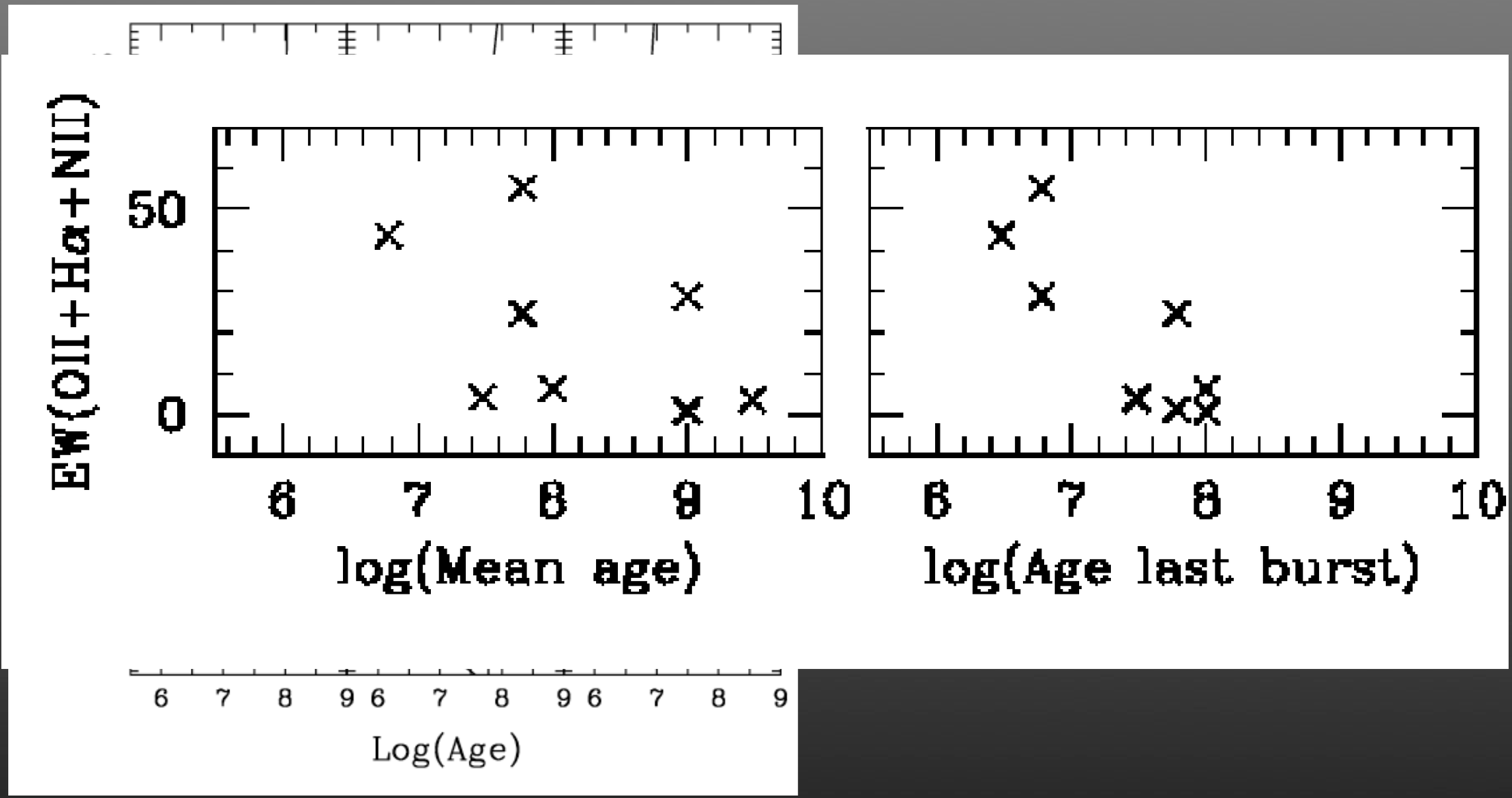
CSP


1
0.1
0.01
0.01
0.1
1
log(M/L_dyn)
log(M/L_composite)

Indices



Last burst


EW(OII+Hα+NII)
50
0
6
7
8
9
10
log(Mean age)
log(Age last burst)

6
7
8
9
6
7
8
9
6
7
8
9
Log(Age)

Conclusions

- Simple tools can lead to robust answers
- Nuclear clusters have a mean light-weighted age of

$$T_{mean} \sim 2 \times 10^9 \text{ years}$$

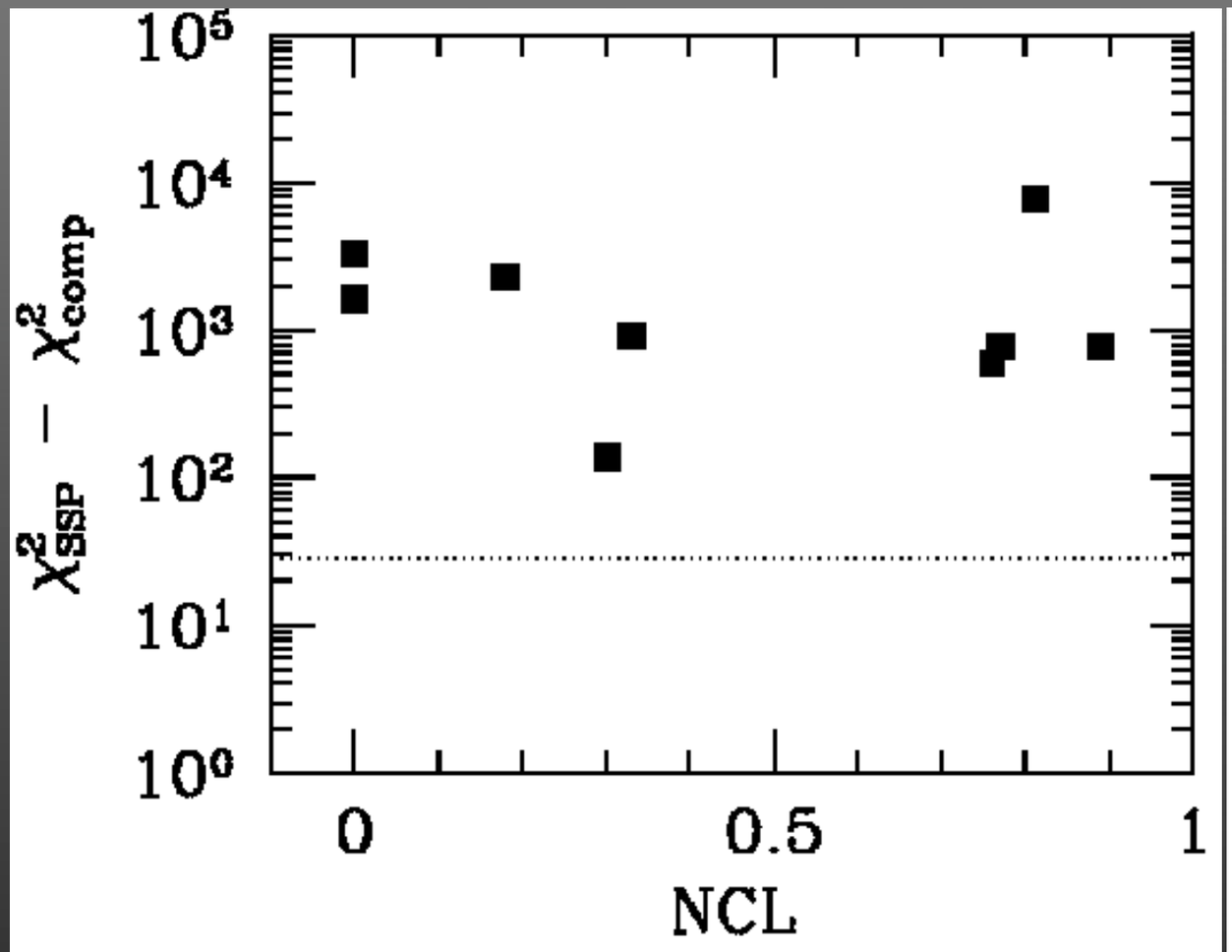
- Nuclear clusters form stars recurrently

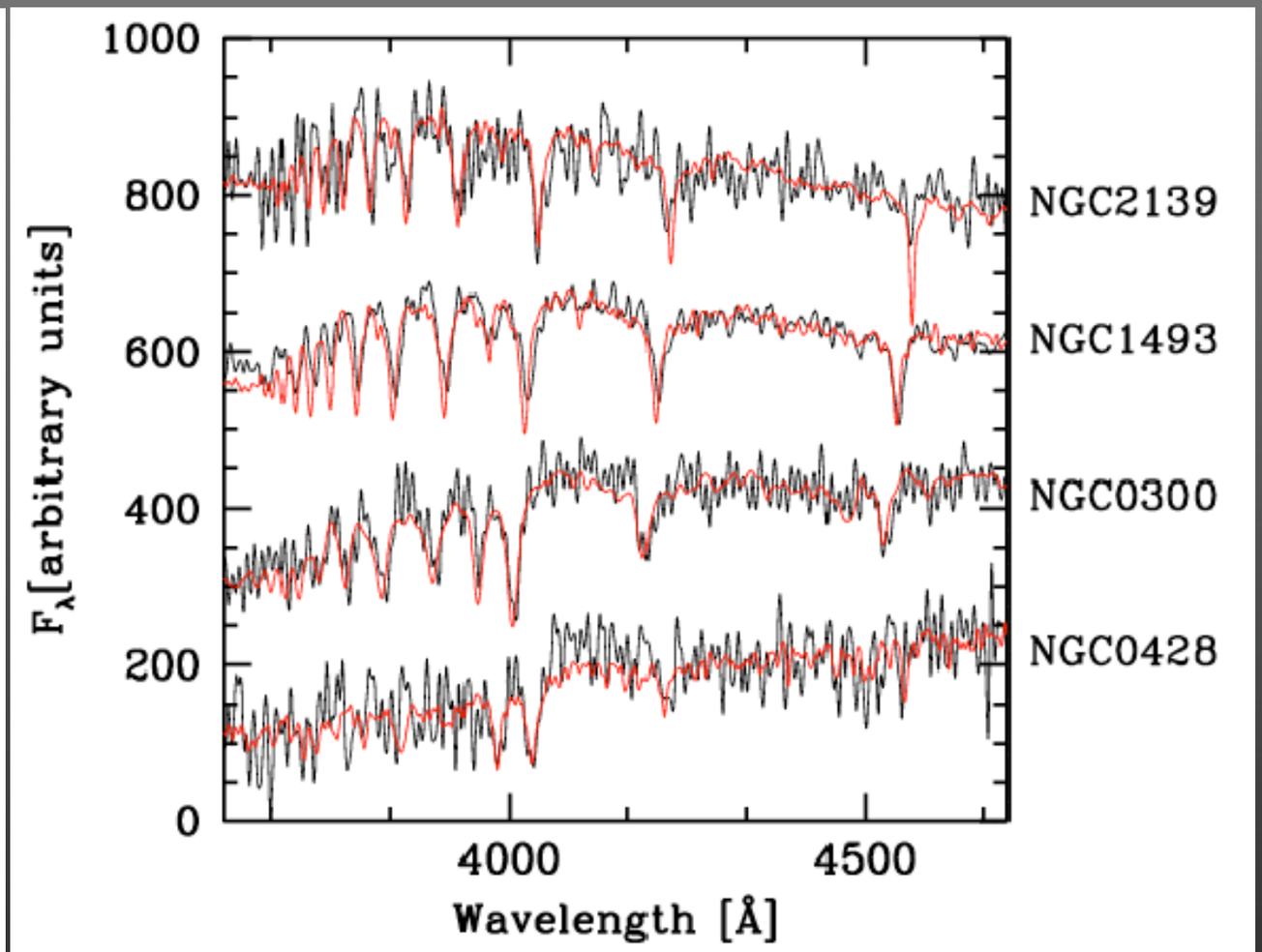
$$\Delta T_{burst} \sim 10^8 \text{ years} \qquad \Delta M \sim 2.5 \times 10^5 \, M_\odot$$

See papers Walcher et al. 2005, 2006

See also P. Ocvirks talk

Non-cluster-light

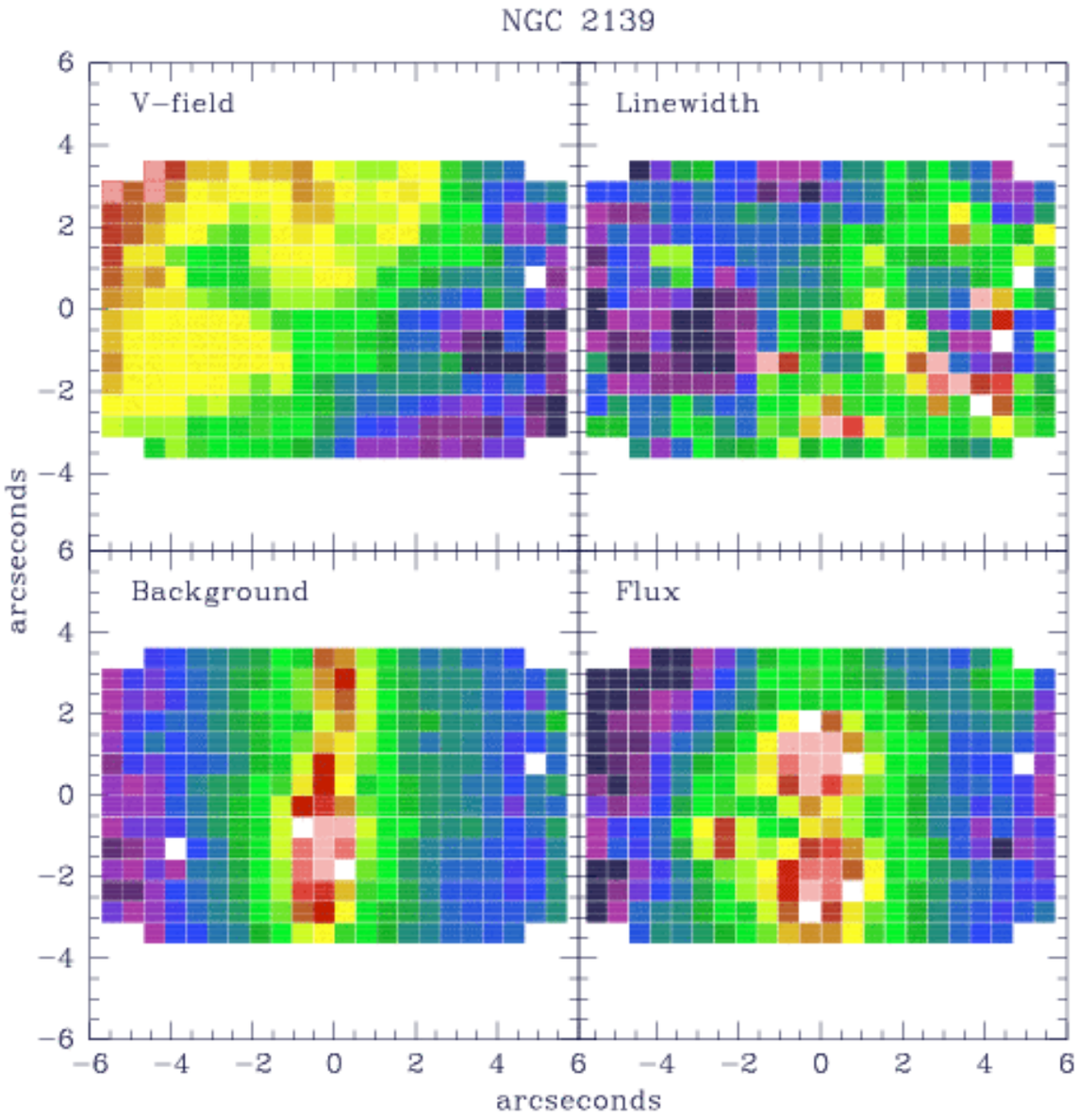


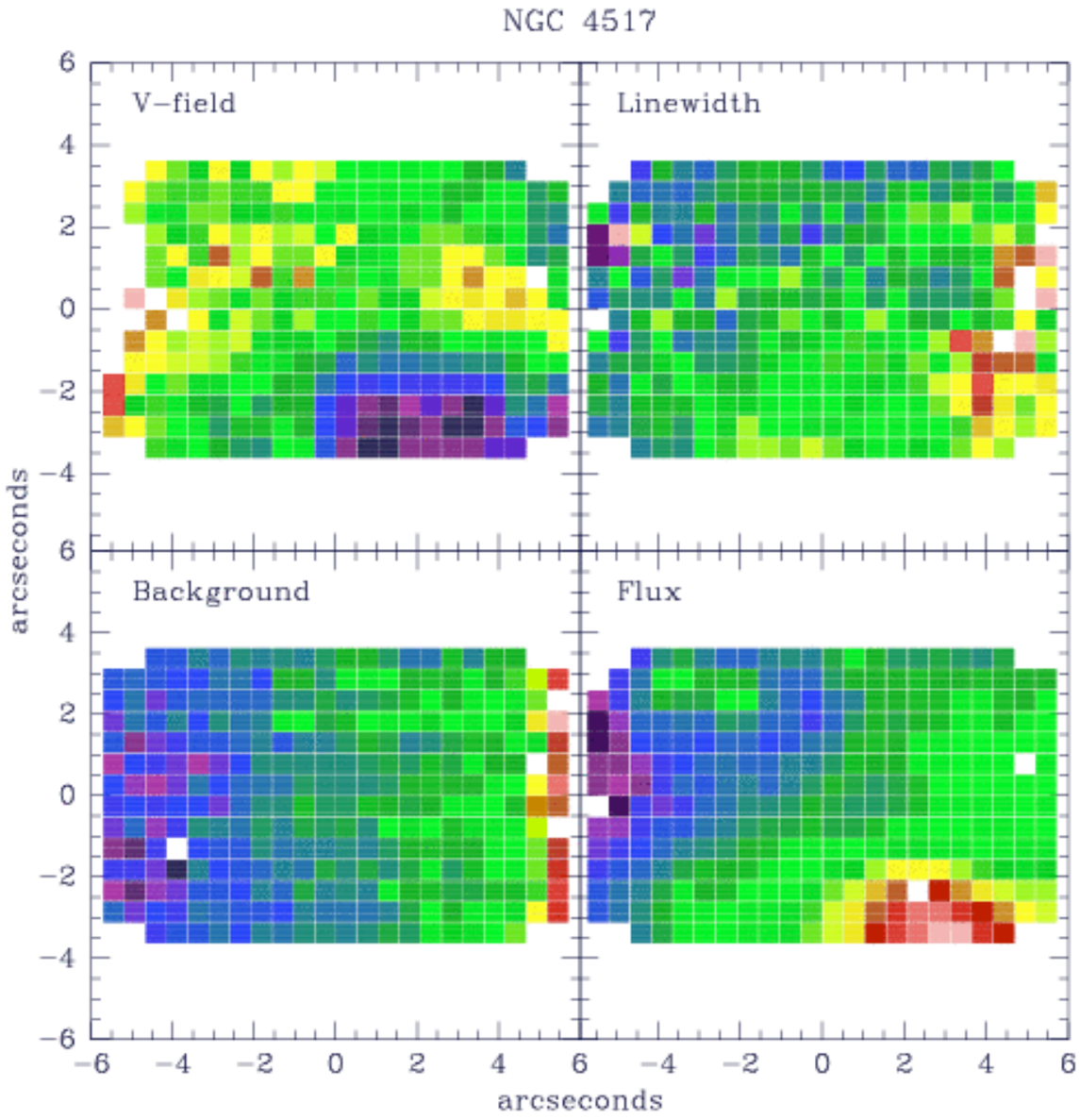


$\Delta\chi^2$ does not depend on NCL STIS 0.2" data compared to UVES 1"

HST/STIS longslit, 4 objects, slitwidth = 0.2", R = 600, S/N = 10, 2900-5700 Å

Nuclear kinematics





Dave Andersen et al., in prep.