Approaching unknown SFHs

Nuclear star clusters

Typical properties:

- in photometric center
- most luminous cluster by 2 mag
- $M_I = -11.5 \pm 4$ mag
- $m_I = 14-19.5$ mag
- $r \sim 5$ pc

just some kind of globular??

Böker et al. 2002

Leiden 27 June 2006

Carl Jakob Walcher
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
Actual fitting

Best fitting SSP

linear combination of templates (CSP) from nnls

Using BC03 models
Age Distribution

Mean lightweighted age depends strongly on method!

SSP: $1 \times 10^8$ yr
CSP: $1-5 \times 10^9$ yr
Indices

![Graph showing recent burst and continuous SF]
Last burst

- Last burst:
- Time between bursts: $\Delta T_{\text{burst}} = 5 \times 10^7 \text{yr}$
- Mass per burst: $\Delta M_{\text{burst}} = 2.5 \times 10^5 \text{M}_{\odot}$
Conclusions

• Simple tools can lead to robust answers
• Nuclear clusters have a mean light-weighted age of
  \[ T_{\text{mean}} \sim 2 \times 10^9 \text{ years} \]
• Nuclear clusters form stars recurrently
  \[ \Delta T_{\text{burst}} \sim 10^8 \text{ years} \quad \Delta M \sim 2.5 \times 10^5 M_\odot \]

See papers Walcher et al. 2005, 2006

See also P. Ocvirk's 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.