In Collaboration with

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GRB Host Studies (GHostS)

GRB 991208

- Redshift $z=0.706$
- Luminosity distance $D=4315$ Mpc
- Galactic dust extinction $E_{B-V}=0.015$
- Spectrum of the optical transient from Castro-Tirado et al. (2001)
- HST image of the host from Andy Fruchter’s GRB web page
- Host SED:

<table>
<thead>
<tr>
<th>Observed wavelength (Å)</th>
<th>Flux (µJy)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>4387</td>
<td>0.347±0.055</td>
<td>Christensen et al. (2004)</td>
</tr>
<tr>
<td>5576</td>
<td>0.571±0.085</td>
<td>Christensen et al. (2004)</td>
</tr>
<tr>
<td>6426</td>
<td>0.632±0.088</td>
<td>Christensen et al. (2004)</td>
</tr>
<tr>
<td>8030</td>
<td>1.21±0.22</td>
<td>Christensen et al. (2004)</td>
</tr>
<tr>
<td>21542</td>
<td>1.32±0.25</td>
<td>Christensen et al. (2004)</td>
</tr>
</tbody>
</table>

- Host emission line fluxes:

<table>
<thead>
<tr>
<th>Emission line</th>
<th>Flux ($10^{-17}$cgs)</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>[OIII] λ3727</td>
<td>17.9±2.2</td>
<td>Castro-Tirado et al. (2001)</td>
</tr>
<tr>
<td>Hβ</td>
<td>38.4±3.3</td>
<td>Castro-Tirado et al. (2001)</td>
</tr>
<tr>
<td>[OIII] λ4959</td>
<td>16.1±3.2</td>
<td>Castro-Tirado et al. (2001)</td>
</tr>
<tr>
<td>[OIII] λ5007</td>
<td>49.0±3.3</td>
<td>Castro-Tirado et al. (2001)</td>
</tr>
</tbody>
</table>
32 GRB hosts
multi-band photometry
Median redshift $z=0.84$

19 [OII]
10 [OIII]
9 H$\beta$

~ 70 papers used
GRB host properties

- Stellar masses
- Star formation rates
- Metallicities
**GRB HOST PROPERTIES**

**Galaxies at z~0.7:**

- Canada France Redshift Survey (CFRS)
- Gemini Deep Deep Survey (GDDS)

*Savaglio et al. (2005)*

\[ 0.4 < z < 1.0 \]
Host stellar mass

Equal stellar masses
different ages (14-19 Gyr)

B & V (Bell et al. 2005)
Host stellar masses

GRB hosts (Bell’s masses)

GDDS K<20.6, z<2
(Glazebrook et al. 2004)
Host metallicity

\[ R_{23} = \frac{[\text{OIII}]+[\text{OIII}]}{H_{\beta}} \]

\[ O_{32} = \frac{[\text{OIII}]}{[\text{OII}]} \]

Pagel et al. (1979)
Kobulnicky & Kewley (2004)
GRB HOST PROPERTIES

![Graph showing GRB host properties with axes labeled log R23 and log O32, and markers indicating Metallicity, Dust, and Ionization.](image)
Mass-Metallicity relation

GRB hosts $z \sim 0.7$

$0.4 < z < 1$

$12 + \log \left( \frac{O}{H} \right)$

$log M_\star [M_\odot]$
**Summary**

- **GHostS** largest host galaxy archive
- Total stellar mass 10x lower than normal high-z galaxies
- Mass-metallicity relation as expected
- 2/3 host galaxies are bursty
- More to come ...