Local environments of SNe Ic and Ic-BL

Credit: Hammersley et al. 2010
Local environments of SNe Ic and Ic-BL

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Credit: Hammersley et al. 2010
Motivation

• What distinguishes a GRB progenitor from that of an ordinary SN Ic-bl without a GRB
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• Study effect of local variations in host galaxy parameters
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- What *distinguishes* a **GRB progenitor** from that of an ordinary **SN Ic-bl without a GRB**
- Study effect of **local variations** in host galaxy parameters
- Does there exist **trends in metallicity**
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- What **distinguishes** a **GRB progenitor** from that of an ordinary **SN Ic-bl without a GRB**
- Study effect of **local variations** in host galaxy parameters
- Does there exist **trends in metallicity**
- Investigate **stellar progenitor population**
Directly finding progenitors is **hard**

Credit: Van Dyk et al. (2012)
- Directly finding progenitors is **hard**

- Local **molecular** gas

Credit: Hatsukade et al. 2014
‐ Directly finding progenitors is **hard**

‐ Local **molecular** gas

‐ Metallicity **gradients** in galaxies

Credit: Sánchez et al. (2014)
- Directly finding progenitors is **hard**
- Local **molecular** gas
- Metallicity **gradients** in galaxies
- SNe progenitors have different ages

Credit: Anderson et al. (2015)
- Directly finding progenitors is **hard**
- Local **molecular** gas
- Metallicity **gradients** in galaxies
- SNe progenitors have different ages
- **Targeted** surveys are **biased**

Credit: Sanders et al. (Levesque) (2012)
- Directly finding progenitors is **hard**
- Local **molecular** gas
- Metallicity **gradients** in galaxies
- SNe progenitors have different ages
- **Targeted** surveys are **biased**
- Hosts **with** GRBs != hosts **without**

Credit: Graham and Fruchter 2013
- Directly finding progenitors is **hard**
- Local **molecular** gas
- Metallicity **gradients** in galaxies
- SNe progenitors have different ages
- **Targeted** surveys are **biased**
- Hosts with GRBs ≠ hosts **without**
- Constrained progenitor masses

Credit: Kuncarayakti et al. (2013b)
Sample

- **19** Targets observed with VIMOS (27"x27" FOV)
- Host of both **Ic** (10) and **Ic-BL** (9) hosts
- **Targeted** (7) and **non-targeted** (12) hosts
- Spatially resolved (100-1000 pc resolution)

### Hosts targeted

- SN1996D T,Ic
- SN1997B T,Ic
- SN1999cn T,Ic
- SN2004fe T,Ic
- SN2006ck T,Ic
- SN2003jd T,Ic-BL
- SN1998ey T,Ic-BL
- SN2004bu T,Ic-BL
- SN2006ip non-T,Ic
- SN2007fj non-T,Ic
- SN2007hn non-T,Ic
- SN2009bh non-T,Ic
- SN2005ks non-T,Ic-BL
- SN2006qk non-T,Ic-BL
- SN2007I non-T,Ic-BL
- SN2007gx non-T,Ic-BL
- SN2007eb non-T, Ic-BL
- SN2004ib non-T, Ic-BL
- PTF 11svt, non-T, Ic
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Typical datacube
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VERY preliminary results
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Modjaz 2012

[Graph showing cumulative fraction of SN types]

Oxygen Abundance at SN position [12+log(O/H)]

19 SN Ib
20 SN Ic
15 SN Ic-bl
6 SN Ic-bl+GRB
Going **forward**
Local environments of SNe Ic and Ic-BL

Progenitor age -> Progenitor mass

Are the local environments exceptional?

E. Pérez-Montero et al. 2010