

## NGC5806 as a SN laboratory iPTF13bvn, PTF12os iPTF14aru (and SN 2004dg)

Progenitor properties, and a host-environment study



# 13bvn



M(B)=-5.2 M(V)=-5.3 M(I)=-5.3

## HST pre & post expl. images Progenitor candidate









 1-d hydro
 semi-analytic

 Nickel mass ~ 0.05 +- 0.015
 Nickel mass ~ 0.05 +- 0.02

 Ejecta mass ~ 1.94 +- 0.5
 Ejecta mass ~ 1.8 +- 0.3

Christoffer Fremling, Stockholm University



Jerkstrand et al. (2014, submitted.)



r-band photometry











### Hydro: not a WR star

### OI/Coindicates <17 Msun ZAMS

Perhaps some Hydrogen in early spectra? Would be consistent with the Yoon (2010) models.

Christoffer Fremling, Stockholm University



# $\label{eq:christoffer Fremling, Stockholm University} Yoon models w. 13 bvn$





-1.0 -1.5 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 2 3 4 5 6 7 8 $M/M_{\odot}$ 

•  $Z=Z_{\odot}$ ,  $f_{wR}=10$ 

-0.5

4

Can we estimate how much H could be present?

15-25 Rsun Piro&Nakar eqns.

Phase [days]

-1

Π

120s





M(B)=23.3 (-8.7) M(V)=23.04 (-9.1) M(I)=22.53 (-9.5)

 $(B-V)_0=0.21$  and  $(V-I)_0=0.44$  (consistent with an early F spectral type).

This could be a highly-luminous supergiant star, or, alternatively, a compact star cluster.

### ground-based pre-expl images Progenitor candidate



12os early spectrum, classification

Habs at 17000km/s, disappears after ~20 d, IIb





Hydrogen at 17000km/s

12os light curves, Ni and Ej mass?





# SN 2004dg





HST pre & post expl. images

No progenitor candidate, only upper limits consistent with RSG, IIP SN

