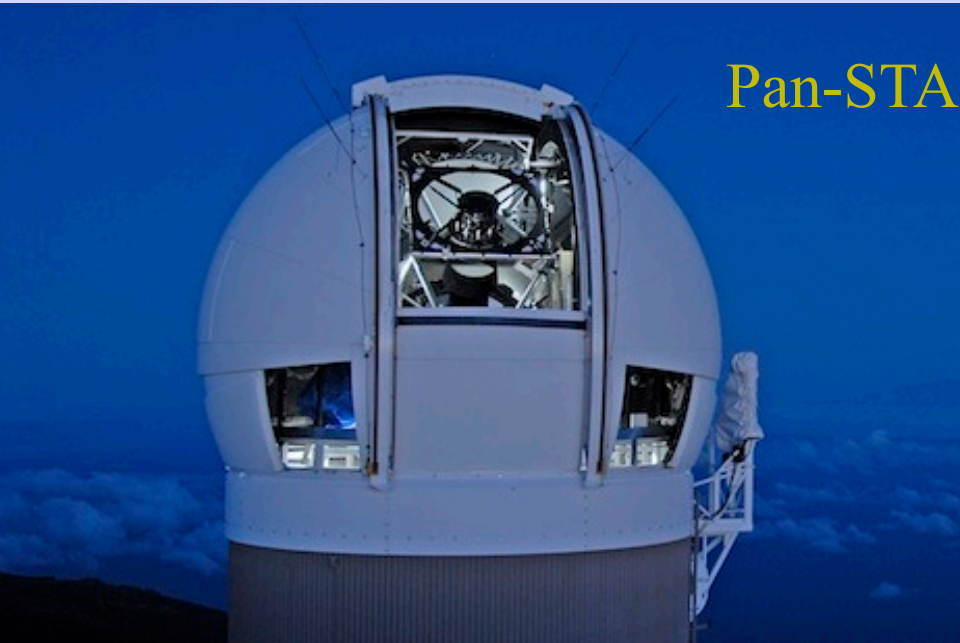


# Pan-STARRS-1



## Ultraviolet and Optical Flare from the Tidal Disruption of a Helium-Rich Stellar Core

Gezari et al Nature in press



garish cartoon

with additional data from Liverpool Telescope, MMT, Chandra, GALEX, UKIRT

# PanSTARRS-1

- 1.8m telescope on Hawaii with FOV 7 sq.deg
- Imaging in *g r i z y*
- Medium Deep Survey : 12 fields, 3 night cadence,  $g=25$ -ish
- 3Pi Survey : 30,000 sq.deg, 2 month cadence,  $g=22$ -ish
- Pipeline in Maui
- Transient pipelines in Harvard and Belfast
- 3 year survey started Jan 2011
- ~3500 "good" transients so far
- ~150 confirmed SNe
- ~tens of good TDE candidates - watch this space

**QC reduces by factor  $10^3$**

PS1-10j

Coincident with small galaxy  
( $M_r = -18.7$ ) at  $z=0.17$

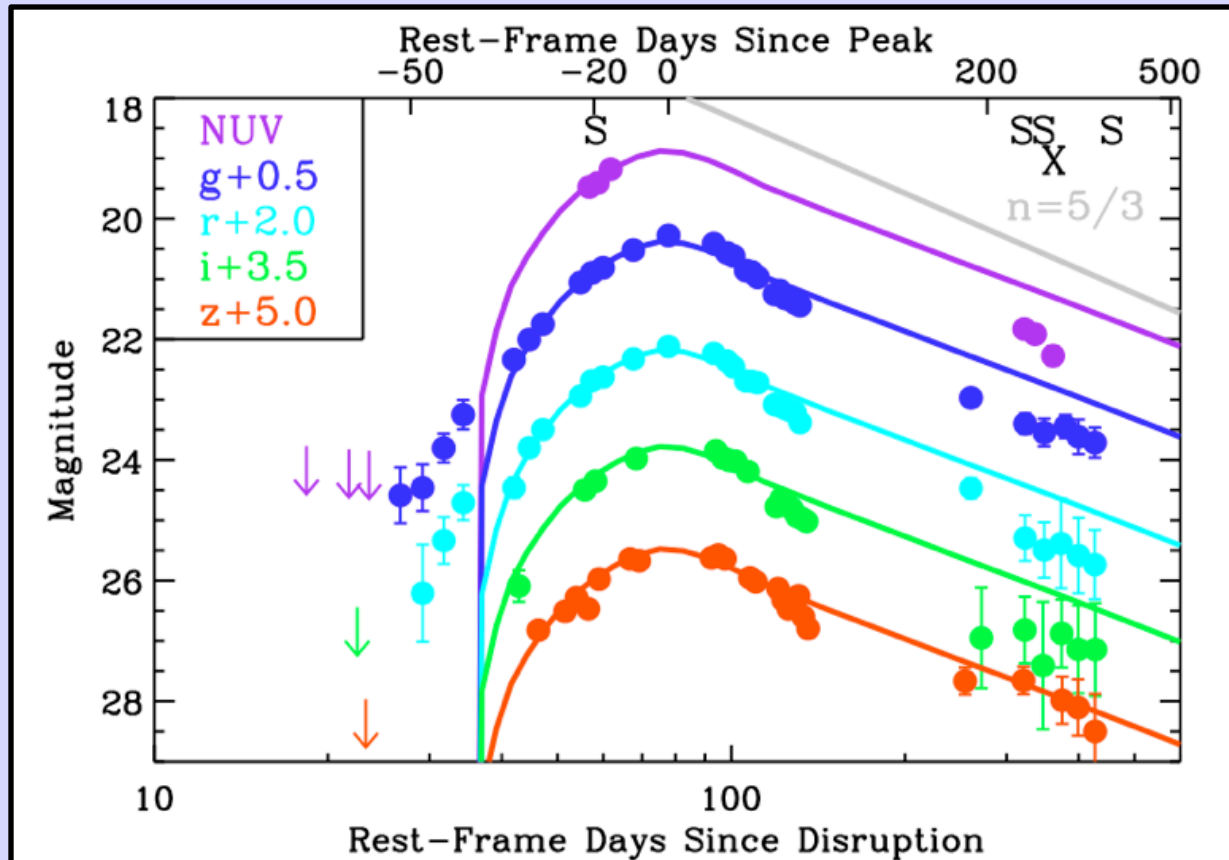
Expected  
 $M_{\text{BH}} = 4 \times 10^6 M_{\text{sun}}$

**First clearly  
detected rise**

Model fit to light  
curve :

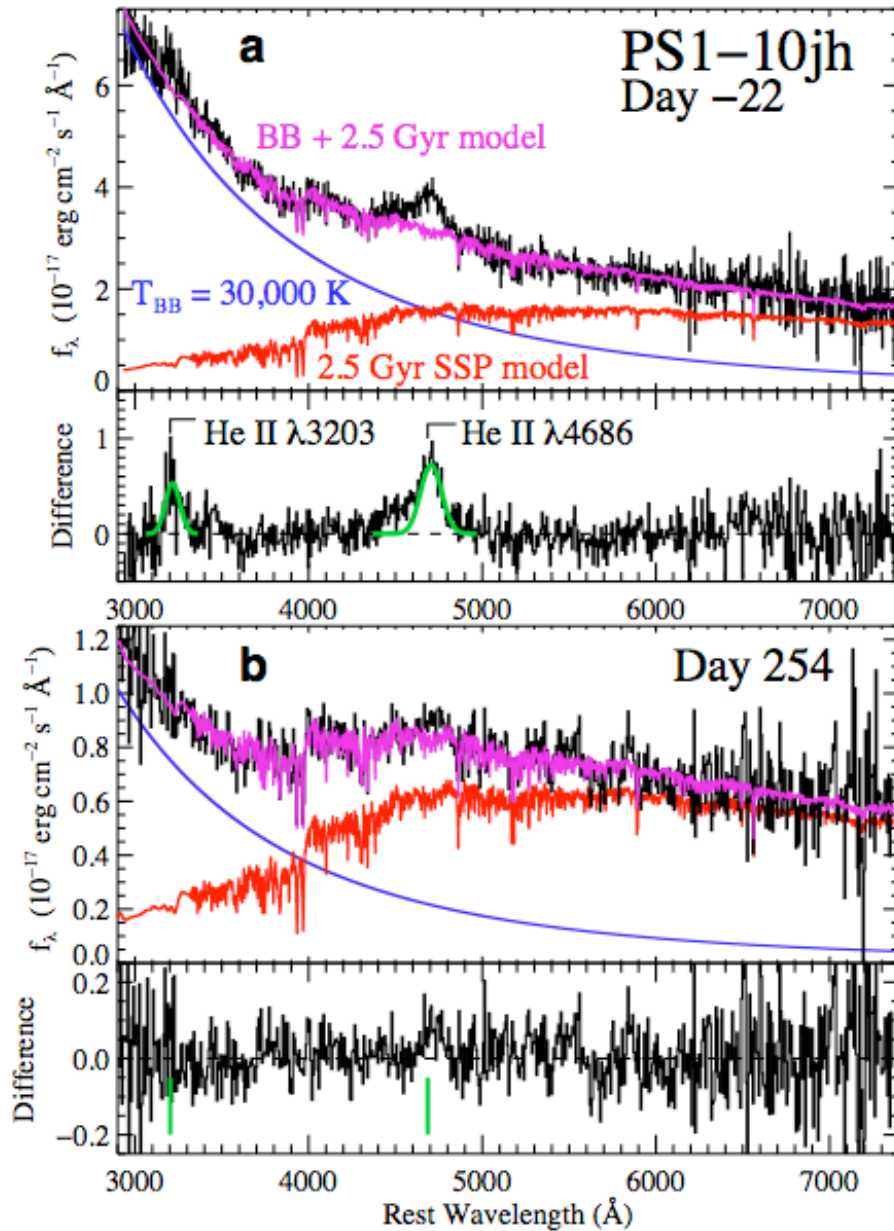
$M_{\text{BH}} \sim 2.8 \times 10^6 M_{\text{sun}}$

fully convective or  
degenerate star,  
 $\gamma = 5/3$  (i.e. not  
concentrated like  
solar type star)



$E \sim 2 \times 10^{51}$  ergs :  $M_{\text{acc}} \sim 0.012 M_{\text{sun}}$

# Spectrum



**Blue continuum and  
very broad He II**

H mass fraction  $< 0.2$

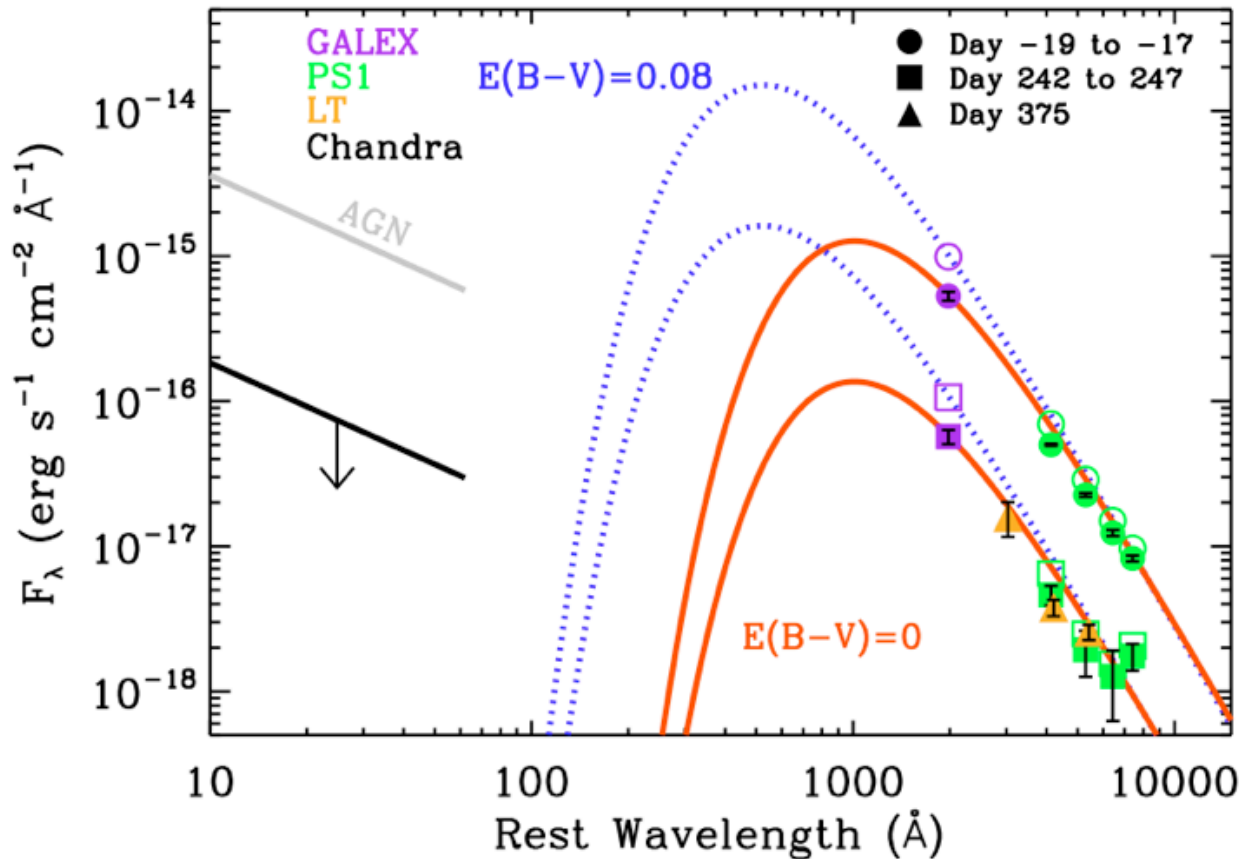
Not plausible if accreting  
from ISM or quiescent  
accretion disc

Proposal : disrupted star is  
He-rich core of Red Giant  
that has lost its envelope

$M^* \sim 0.2 M_{\text{sun}}$

$f_{\text{acc}} = 0.06$

# SED



**T ~ 30,000 K**

**cf naive  
250,000K**

Same problem  
as all AGN ...

Stays hot at  
late times  
==> not SN

X-ray quiet compared to normal AGN

$$L_{\text{peak}} \sim 2 \times 10^{37} \text{ W} \sim 0.6 L_{\text{Edd}}$$

**FIN**