Draft version January 2, 2022
Typeset using LaTeX **twocolumn** style in AASTeX631

SN 2020jgb

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ABSTRACT

Keywords: keywords

1. INTRODUCTION

2. OBSERVATIONS

2.1. *Detection and Classification*

SN 2020jgb was first discovered by the Zwicky Transient Facility (ZTF; Bellm et al. 2019; Graham et al. 2019) on 2020 May 03.463 UT (MJD 58972.463) with the 48-inch Samuel Oschin Telescope (P48) at Palomar Observatory. The internal designation is ZTF20aayhacx. It was detected at a magnitude of 19.86 in ZTF g-band, and J2000 coordinates $\alpha = 17^{\rm h}53^{\rm m}12^{\rm s}.651$, $\delta = -00^\circ51'21''.81$. The last non-detection was on 2020 April 27.477 (MJD 58966.477; 5.99 days before the first detection) up to a limiting magnitude of 20.7 in ZTF r-band.

Classification, ...

2.2. *Optical Photometry*

We obtained gr-band photometry of SN 2020jgb with the ZTF camera. A Galactic extinction of $E(B-V) = 0.404$ is reported by the maps of (Schlafly & Finkbeiner 2011), for which we correct all our photometry. We do not account for any additional host extinction due to the lack of any Na I D absorption in our spectra (**Is it in the outskirt?**).

2.3. *Optical Spectroscopy*

2.4. *Near-infrared (NIR) Spectroscopy*

We obtained one NIR spectrum of the transient using the Gemini near-infrared spectrometer (GNIRS; Elias et al. 1998) on the Gemini North telescope on 2020 June 9 (≈22 days after r-band peak), for an integration time of 2400 s. The spectra were reduced with the `PypeIt` Python package (Prochaska et al. 2020; Prochaska et al. 2020).

3. ANALYSIS

3.1. *Photometric Properties*

- sub-luminous
- first light time, peak time
- color evolution

3.2. *Spectroscopic Properties*

- infrared Ca II triplet (Ca II IRT)
- tentative He I absorption at ≈9900 Å

3.3. *Optical Spectroscopy*

4. HOST GALAXY

5. MODEL COMPARISONS

6. DISCUSSION AND CONCLUSION

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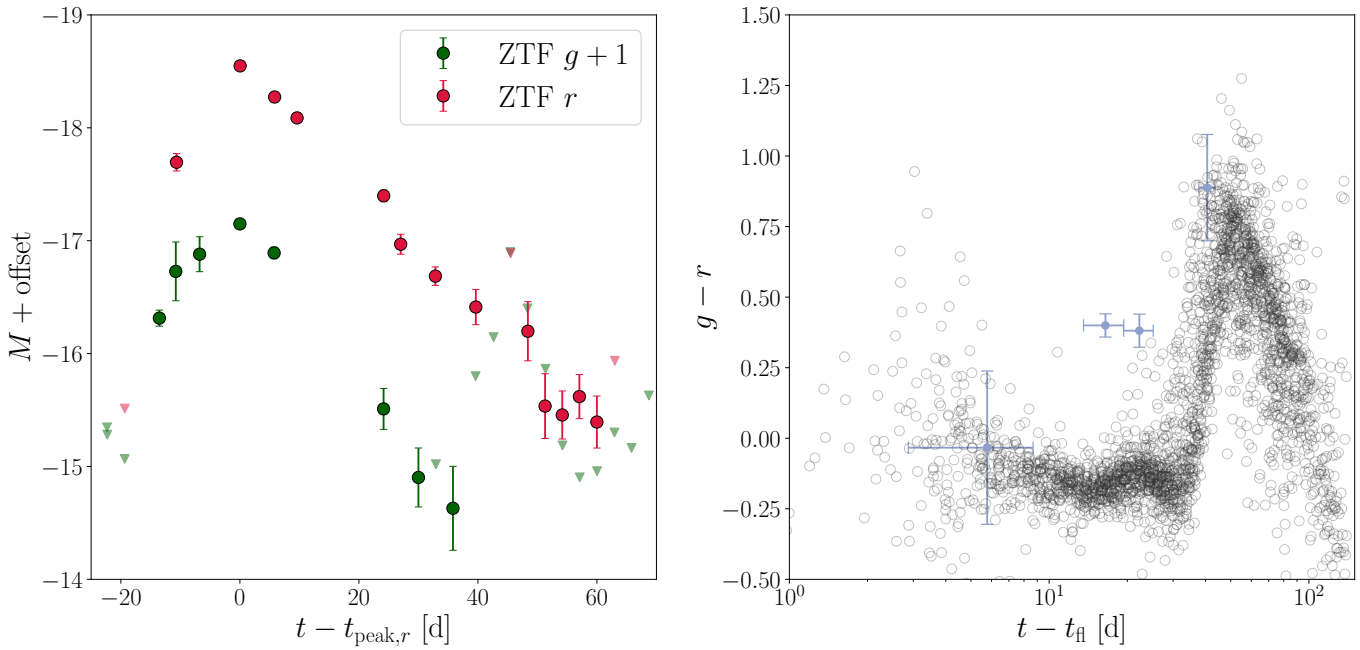

Figure 1. *Left*: multi-color (ZTF g and r bands) light curves of SN 2020jgb after extinction correction. The inverted triangles are 5-σ upper limits. *Right*: $g - r$ color evolution of SN 2020jgb (blue dots), accompanied by 62 normal SNe Ia (open circles) with prompt observations within 5 days of first light by ZTF (Bulla et al. 2020). The shaded region denotes the 1-σ credible interval of the color of SN 2020jgb, estimated using Gaussian process.

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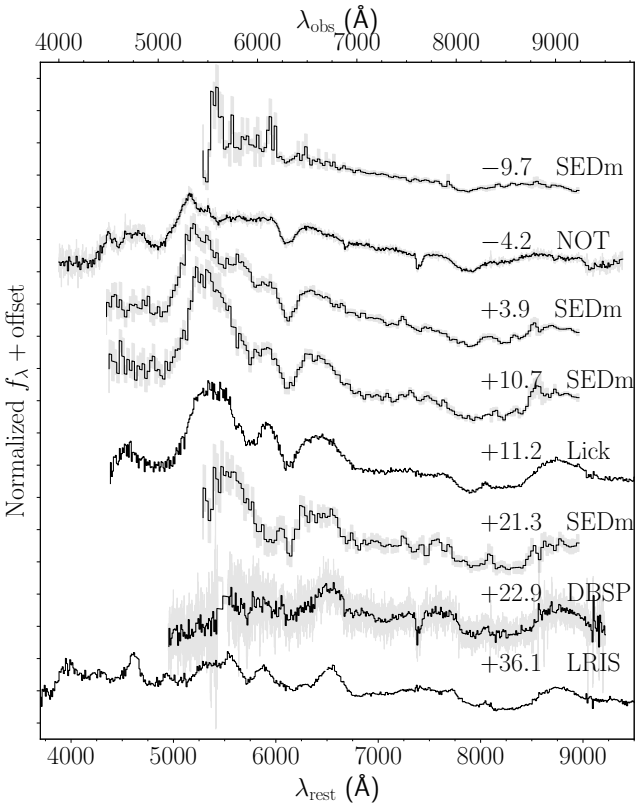

Figure 2. Optical spectroscopic sequence of SN 2020jgb. Rest frame phases (days) relative to the r-band peak and instruments used are posted next to each spectrum. The black curves are binned spectra with a bin size of 10 Å, except for the SEDm spectra, whose resolution is lower. The 1-σ uncertainties of raw spectra are shown in grey. Only regions with SNR > 3 after binning are plotted.

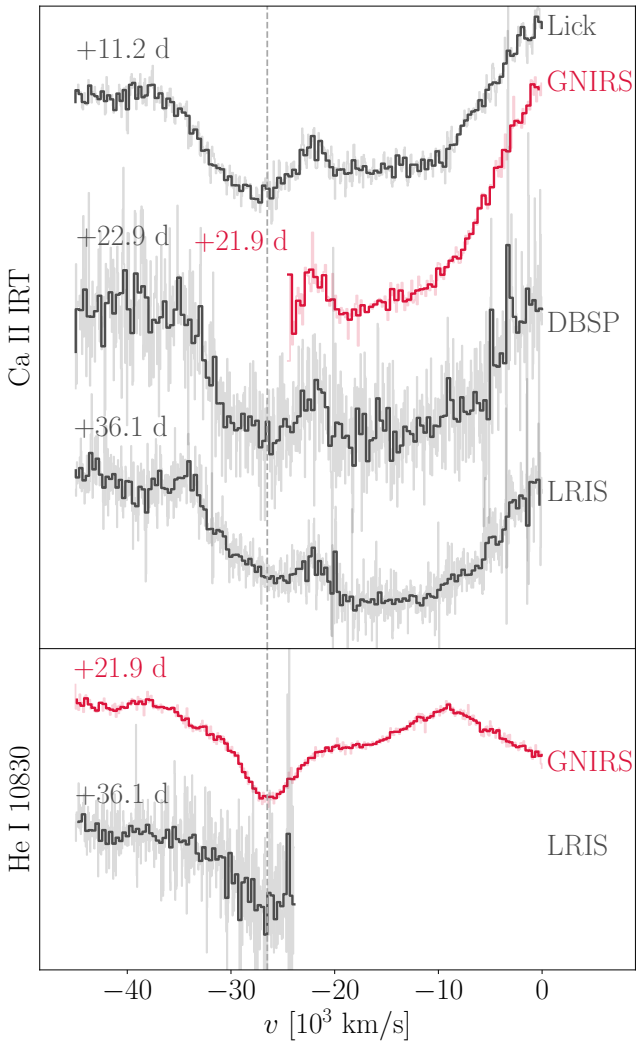

Figure 3. Spectra in the velocity space, comparing the high-velocity component of Ca II IRT and the absorption feature at ≈9900 Å assuming it is associated with He I at 10830 Å.