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# SN 2022joj

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## ABSTRACT

*Keywords:* Supernovae (1668), Type Ia supernovae (1728), White dwarf stars (1799), Observational astronomy (1145), Surveys (1671)

1. INTRODUCTION
2. OBSERVATIONS
2.1. *Optical Photometry*
2.2. *Optical Spectroscopy*
3. ANALYSIS
3.1. *Optical Spectral Properties*
4. DISCUSSION
4.1. *Models*
5. CONCLUSIONS

*Facility:* PO:1.2m (ZTF), PO:1.5m (SEDM), Gemini:Gillett (GNIRS), Hale (DBSP), NOT (ALFOSC), Shane (Kast Double spectrograph), Keck:I (LRIS), Keck:II (DEIMOS).

*Software:* `astropy` (Astropy Collaboration et al. 2013, 2018), `CASTRO` (Almgren et al. 2010), `dynesty` (Speagle 2020), `emcee` (Foreman-Mackey et al. 2013), `LAMBDAR` (Wright 2016), `matplotlib` (Hunter 2007), `prospector` (Johnson et al. 2021), `PypeIt` (Prochaska et al. 2020), `pysedm` (Rigault et al. 2019), `Python-FSPS` (Conroy et al. 2009; Conroy & Gunn 2010), `scipy` (Virtanen et al. 2020), `seaborn` (Waskom 2021), `SEDONA` (Kasen et al. 2006).

**Table 1.** Spectroscopic observations of SN 2022joj and the host galaxy.

| $t_{obs}$ (MJD) | Phase (days) | Telescope/ Instrument | $R$ ($\lambda/\Delta\lambda$) | Range (Å) | Airmass |
|---|---|---|---|---|---|
| 58,976.42 | −9.7 | P60/SEDM | 100 | 3770–9220 | 1.23 |
| 58,982.12 | −4.2 | NOT/ALFOSC | 360 | 4000–9620 | 1.17 |
| 58,990.43 | +3.9 | P60/SEDM | 100 | 3770–9220 | 1.23 |
| 58,997.44 | +10.7 | P60/SEDM | 100 | 3770–9220 | 1.29 |
| 58,998.41 | +11.6 | Shane/Kast | 750 | 3620–10720 | 1.28 |
| 59,008.41 | +21.3 | P60/SEDM | 100 | 3770–9220 | 1.28 |
| 59,009.45 | +22.4 | Gemini-N/GNIRS | 1800 | 8230–25150 | 1.07 |
| 59,010.40 | +23.3 | P200/DBSP | 700 | 3200–9500 | 1.27 |
| 59,023.58 | +36.1 | Keck I/LRIS | 1100 | 3200–10250 | 2.04 |
| 59,107.29 | +117.3 | Keck I/LRIS | 1100 | 3200–10250 | 1.31 |
| 59,143.26 | +152.2 | Keck I/LRIS | 1100 | 3200–10250 | 2.16 |
| 59,669.60 | host | Keck II/DEIMOS | 2100 | 4500–8700 | 1.14 |

Note—Phase is measured relative to the $r_{ZTF}$-band peak in the rest frame of the host galaxy. The resolution $R$ is reported for the central region of the spectrum.

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