

N05a A peculiar Type Ia supernova with subluminescent and high-velocity features

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Type Ia supernova (SN Ia) is an important object because the accelerated cosmic expansion has been discovered using its properties. The progenitor nature and the explosion mechanism remain unresolved. One of the keys to understanding them is to unveil the observational diversity. We have performed the follow-up observations of a SN Ia 2020qxp in optical and near-infrared wavelengths using 1.5-m Kanata and 3.8-m Seimei telescopes since the rising stage up to around 180 days after the maximum date. The light curve shows the moderately fast decline. We observed the $B - V = 0.6$ around the maximum. From the near-infrared luminosity and the Lira relation, we estimated the color excess of $E(B - V) = 0.6$ of the host galaxy. After the extinction correction, the peak quasi-bolometric absolute luminosity is calculated to be 3.2×10^{42} erg s⁻¹. The radioactive ⁵⁶Ni is synthesized as $\sim 0.4 M_{\odot}$ which are consistent with those of a transitional SN Ia. Spectra show the strong Si II $\lambda 6355$ and Si II $\lambda 5972$ absorption lines around the maximum light. The equivalent width ratio of two Si II lines is rather consistent with that of the subluminescent subclass like SN 1991bg. A very large expansion velocity of ~ 16000 km s⁻¹ was found before the maximum, and thereafter the velocity dropped to ~ 10000 km s⁻¹ around the maximum. We suggest that this SN exhibits the multi-faced features among SNe Ia. From these analyses, we will discuss the explosion properties and mechanisms of this SN Ia.