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SUPERNOVA 2005gj

J. Prieto, Ohio State University (OSU); P. Garnavich, University of Notre Dame; and D. DePoy, J. Marshall, J. Eastman, and S. Frank, OSU, on behalf of the SDSS-II Supernova Collaboration, report that spectra (range 390–730 nm; resolution 0.31 nm/pixel) of SN 2005gj (cf. *CBET* 247, *IAUC* 8616) were obtained with the MDM 2.4-m telescope (+ CCDS) approximately once per week since its discovery. Initially classified as a type-IIn event based on the presence of resolved Balmer emission, the spectrum has evolved to show broad absorption features at $\sim$ 440, 475, 510, and 610 nm (rest-frame for $z = 0.062$), while the Balmer emission lines remain. The spectrum obtained on Nov. 12.3 UT is remarkably similar to the spectrum of the peculiar type-Ia supernova 2002ic (cf. *IAUC* 8019, 8151, 8157, 8161) obtained on 2002 Dec. 27 (Hamuy *et al.* 2003, *Nature* **424**, 651). It is concluded that SN 2005gj is a 1991T-like type-Ia event interacting with circumstellar material and giving rise to the resolved emission lines on top of the characteristic type-Ia spectrum. This is the second clear detection of hydrogen in the spectrum of a type-Ia supernova. The preliminary SDSS-II light curve indicates that it has just passed maximum light (at magnitude $r \sim 17.2$). The study of SN 2005gj at all wavelengths is urged, as such data could help to understand better the nature of the progenitors of thermonuclear supernovae.

S. Immler, Goddard Space Flight Center (GSFC), NASA, and Universities Space Research Association; R. Petre, GSFC; and P. Brown, Pennsylvania State University, on behalf of the Swift-satellite team, report on Swift Ultraviolet/Optical Telescope (UVOT; wavelength range 170–650 nm) and X-Ray Telescope (XRT; energy range 0.3–10 keV) observations of SN 2005gj obtained on Nov. 24.181 UT. A new source is detected at $\alpha = 3^{h}01^{m}11^{s}.91$, $\delta = -0^{\circ}33'13''.2$ (equinox 2000.0), when compared to Digitized Sky Survey images — consistent with the reported Sloan Digital Sky Survey II position in *CBET* 247. UVOT magnitudes are $V = 17.5$ (641-s exposure), $UVW1$ [181–321 nm] = 19.1 (80 s), $UVM2$ [166–268 nm] = 20.0 (1272 s), and $UVW2$ [112–264 nm] = 19.5 (2847 s); statistical and systematic errors are 0.1 mag each. No x-ray source is detected at the position of SN 2005gj in a simultaneous 4695-s XRT observation. The 3σ upper limit to the (0.3–10-keV band) count rate is 1.85×10^{-3} counts/s, corresponding to an x-ray flux of 1.06×10^{-13} erg cm^{-2} s^{-1} for an assumed thermal plasma spectrum with a temperature of 8 keV and an absorbing foreground column density of 7.08×10^{20} cm^{-2} (Dickey and Lockman 1990, *ARAA* **28**, 215).

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