

## Study of optical spectra of four bright comets observed in 2009–2011

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We present results of a study of middle-resolution optical spectra of comets 103P/Hartley 2, C/2009 K5 (McNaught), C/2009 P1 (Garradd), and C/2007 N3 (Lulin). The spectra were obtained with the echelle spectrograph and with the slit spectrograph installed on the 2-m Zeiss reflector of the high-altitude astronomical station of the Institute of Astronomy of the Russian Academy of Sciences and the Main Astronomical Observatory of the National Academy of Sciences of Ukraine at Peak Terskol in 2009–2011. Detailed identification of the spectral emission lines and values of certain physical parameters of the neutral comas (velocities of gas expansion, lifetimes of molecules C<sub>2</sub>, C<sub>3</sub>, and CN, and other parameters) of these comets are presented.