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Development of a compact spectrograph for the spectrum survey of small solar system bodies

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We are developing a compact spectrograph for the spectrum survey observations of small solar system bodies. It consists of commercial products, a spectrograph DSS-7 manufactured by SBIG, a CCD camera ST-8E by SBIG, and a 30-cm Schmidt-Cassegrain telescope by MEADE. It is set up in the neighboring space at the Bisei Spaceguard Center. DSS-7 is a compact spectrograph, which consists of a slit, a grating, and other optical elements. It covers the wavelength range from 4000 to 8000 angstroms, in standard use, such as coupling use with an ST-402 CCD. We are planning to use it as a spectrograph that covers the range between 4300 and 8600 angstroms, in using with a large formatted CCD and an order-cutting filter. 50-micron, 100-micron, 200-micron, and 400-micron slits are available. The spectral resolution is 16 angstroms with the 50-micron slit. The limiting magnitude of 11 or 12th will be achieved in 120 seconds exposure.
The main observation objects are small solar system bodies, especially Near-Earth Objects. We are planning to carry out the systematic survey of the reflected spectra of asteroids and to observe the time variation of their reflected spectra, in order to investigate surface property of the asteroids. We also intend to apply this spectrograph for the "Target of Opportunity" spectroscopic observations of not only solar system bodies but other transient objects.

Keywords: small solar system body, asteroid, transient object, spectroscopy