# Slitless Spectroscopy of Small Solar System Bodies on a Dark Cloud Curtain

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We carried out the slitless spectroscopy of Small Solar System Bodies (SSSBs) in order to obtain their taxonomic types by 8.2m Subaru telescope which was equipped with Suprime-Cam. We used two grism filters; G-A-B030 (blue grism) and G-A-R030 (red grism) of S-prime-Cam for slitless spectroscopic observations. The throughput of both grism are ~50% and resolution is $\lambda / \delta \lambda$ ~40. The wavelength range of Blue grism is 4500-7000Å and that of Red grism is 6250-8600Å. One of the difficulties in the slitless spectroscopy is the overlap of more than two objects. However, we could avoid contaminations of spectra due to the overlap of objects by introducing a novel idea of using a Galactic dark cloud as a "curtain".

We observed the $\rho$ Oph region (centered at RA.16: 27:24.2, Dec. -24:25:06 J2000) with the grisms in a single night on May 26, 2009. For calibrations, we also took B, R, i-bands images at the same night. We observed LDS749B for flux calibration and Landolt stars of SA107 for photometric calibration. For wavelength calibrations, we used QSOs and the absorption line of A-band of stars (7619 Å) for Red grism and the Hel line of LDS749B for Blue grism. We used Dome flat. For orbit determination, we observed the $\rho$ Oph region in additional two nights, but only for 12 minutes in R band in each night.

We detected 289 SSSBs (R<25 mag) and obtained grism spectra of 37 SSSBs (R<23 mag). We could determine the orbits for 85 objects by using the observational arc of 3 consecutive nights and for 198 objects by just their velocities. Then we divided detected objects into asteroid groups (inner, middle, outer belt, Hilda, Jupiter Trojan and TNO). We classified asteroids into 4 types (S, Q, C, D) by their grism spectra.

Based on our preliminary results, the middle belt seems to have most variety of asteroid types (S:43%, Q:33%, C:14%, D:10%). And our analysis so far indicates that there are more Q types in the middle belt than in the inner belt. This might mean that there is one of supply sources of Q type (ordinary chondrite) in the middle belt.