

## Doppler-free spectroscopy experiments for the Antarctic Potassium resonant lidar

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The National Institute of Polar Research (NIPR) is leading a six year prioritized project of the Antarctic research observations since 2010. One of the sub-projects is entitled "the global environmental change revealed through the Antarctic middle and upper atmosphere". Profiling dynamical parameters such as temperature and wind, as well as minor constituents is the key component of observations in this project, together with long-term observations using existent various instruments in Syowa, the Antarctic (39E, 69S). As one of the instruments in this project, a new resonance scattering lidar system with tunable wavelengths is developed to be installed and operated at the Syowa Station. The lidar transmitter is based on injection-seeded, pulsed alexandrite laser for 768-788 nm (fundamental wavelengths) and a second-harmonic generation (SHG) unit for 384-394 nm (second harmonic wavelengths). In order to tune the seeder laser to absolute Potassium resonance line, Doppler-free spectroscopy with a Potassium cell is crucial. The measurement was done at NIPR and the Doppler-free spectrum was recorded with 0.005 pm wavelength resolution. Three absorptions spaced with 0.05pm at the cross-over wavelength were clearly measured. In this talk, details of the experiment will be shown.

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