

**R005-P27**

**ポスター 3 : 11/6 AM1/AM2 (9:00-12:30)**

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## **Faraday filter transmission measurements with a narrowband 589 nm light source for the Na lidar observations at Tromsø**

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An Na lidar at Tromsø is currently at a stage of upgrading the receiver system for the thin Na atom observations in the lower thermosphere (<200km). The Na atom density at this altitude region is expected to be only ~2-3 atoms/cm<sup>3</sup> compared with ~2,000 atoms/cm<sup>3</sup> at the Na layer peak (~90 km). To achieve the high S/N ratio measurement, even at the nighttime, the ultra-narrow optical filter such as a Faraday filter is necessary to reject the background skylight. The Faraday filter consists of a heated Na cell placed in a strong magnetic field (i.e., ~200 mT) between two polarizers. Using the Faraday rotation and the Zeeman effect, ultra-narrow optical bandpass (~10GHz or ~0.01nm at 589 nm) can be achieved.

We assembled a transmission diagnosis system at 589 nm on the basis of two narrowband DFB lasers at RIKEN. The more robust system is already used for the lidar observations. The details of the DFB laser system and the measured Na-saturation spectrums for the absolute frequency reference are presented by Hyodo et al. at the SGEPPSS fall meeting, 2022. Using the same light source, the transmission profile measurements of the Faraday filter can be conducted.

In this talk, the results of the transmission measurements are discussed, and the performance of a commercially available Na cell is evaluated. A newly developed Na cell is also presented.