

R011-04

C 会場 : 9/27 AM1 (9:00-10:30)

9:45~10:00

EISCAT_3D レーダーにおけるアンテナレイの較正

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Antenna Array Calibration in EISCAT_3D

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EISCAT_3D is an international research infrastructure consisting of three (or five in the final design) phased-array incoherent-scatter radars in the northmost areas of Norway, Finland, and Sweden. The radar system is capable of volumetric and interferometric imaging of physical quantities with broad spatial coverage and fine resolution. It will thus cover vast research fields, including studies of the atmosphere and near-Earth space environment, the solar system and radio astronomy, space weather forecast, and space debris monitoring.

Aiming for the first light of the EISCAT_3D in 2023, one of our recent focuses is on calibrating the antenna array. Antenna array calibration is crucial for the quality of acquired data, especially if the radar system targets very weak signals such as incoherent scattering. Specifically, calibration here refers to; 1. fine measurement of antenna location and orientation, 2. timing and gain adjustment of transmitters/receivers, and 3. estimating overall system noise temperature and beam pointing accuracy. To achieve these goals, we developed several calibration schemes that use three calibration towers near the antenna arrays or radio emissions from celestial objects.

Another critical topic is hard target echo removal (HTER), which automatically cleans data for security reasons. We need to carefully design the procedure for the HTER to mitigate data losses, so we estimated what procedure of HTER discards what percent of data.

In this presentation, we will report the current status of the software development of the EISCAT_3D, particularly the part that assures the quality of acquired data.

本発表では、EISCAT_3D レーダーにおけるアンテナレイの較正手法と、関連するソフトウェア開発の状況について報告する。