

Introduction to Radio Astronomy (WBAS14001)

Practical Assignment 2

This practical assignment corresponds to 10 percent of the final class grade.

Deadline for submission of report – Friday 23rd December 2016, 1:00 pm (only via email: spingola@astro.rug.nl).

The aim of this practical exercise is to analyse the data taken with the Kapteyn Radio Telescope to determine the atmospheric opacity τ and the Cosmic Microwave Background temperature.

The assessment will be based on a report that summarises the properties of the telescope, the observations, processing and results that were obtained.

Each person will provide an independent lab report, with their own calculations. Each report should be written in your own words, reports will be checked using the RuG plagiarism tools.

The written report must be in English, starting with a title (decided on by each student), the name of the author and an abstract (un-numbered section at the beginning that summarises the contents of the report). All figures and tables must be numbered and referred to in the text as Fig. 1, Table 1, etc. and the estimated values must be reported with their uncertainty.

This practical is also an exercise in scientific writing, so take care to be specific where possible and be as concise as possible. The length of the report is left to the author, but it will likely need to be around 2000 words (5/6 pages) to concisely explain all parts of the observations, data analysis and conclusions. The format of the contents of the report should be as follows:

1. Introduction – Summary of the aim of the observations, briefly introducing the concepts of radiative transfer, brightness temperature, atmospheric opacity and the Cosmic Microwave Background.
2. Observations – Summary of the telescope, observing set-up and the calibration procedure.
3. Results – Summary of the analysis steps used to process the data, pointing out any specific issues with the data, a presentation of the scientific results.
4. Discussion – Summary of the results, comparison with the theoretical curves you fit to determine τ , hypothesis on every possible deviation from the expected trend.
5. Conclusions – Summary of what you have found out about the response of the instrument, the opacity of the atmosphere. Would you be able to measure T_{CMB} ? Why? Explain how you could improve the experiment next time.