

PHYS 434

LAB 5

Kun Zhang

HERA DATA ANALYSIS

HERA (Hydrogen Epoch of Reionisation Array) radio telescope

HERA is an American, South African and British collaboration to build a telescope capable of making a solid detection of the Epoch of Reionisation (EOR) red-shifted hydrogen power spectrum signature, as well as conducting initial EOR science and launching this new scientific field of the observational cosmic dawn. [1]

HERA has just one goal: to characterize the epoch of reionisation. It will give us a 3D map of the universe during this era.

How data was collected.

HERA was designed to detect radio waves in the low-frequency range of 100–200 MHz, which allows it to detect fluctuations in the emissions from neutral hydrogen gas that was found throughout the universe before stars, galaxies and black holes formed. Being a low-frequency instrument, the field-of-view for an antenna of a particular size is much larger than it would be if high frequencies were being detected.

This allows one to see the sky at low frequencies in one go.

Observations.

HERA DATA

flags (5329204, 2)

8-bit enum (FALSE=0 TRUE=1), 82680 x 1 x 1024 x 4

Number of attributes = 0

samples (1134700096, 2)

32-bit floating-point, 82680 x 1 x 1024 x 4

Number of attributes = 0

From visual data

visdata (5328572, 2)

Compound/Vdata, 82680 x 1 x 1024 x 4

Number of attributes = 0

The values indicated are the amplified signal of the waves received by the HERA telescope.

Bibliography

- [1] "SARAO," South African Radio Astronomy Observatory, 2019. [Online]. Available: <https://www.ska.ac.za/science-engineering/hera/>. [Accessed 2019].