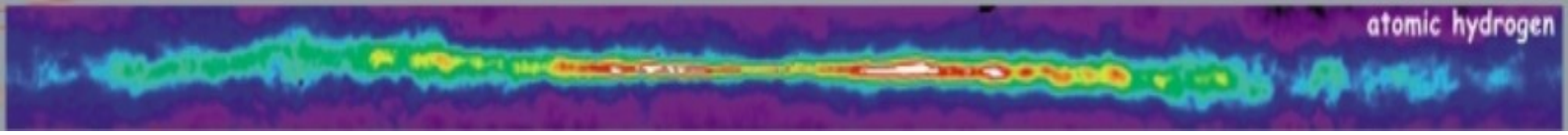

Leonardo Rossoni – 19/04/2024

DEV - RADIOASTRONOMY

Report number 0: Introduction to building a radiotelescope

This first report aims to introduce the design and building phase of the entire project.

What is a radio telescope?
A radio telescope is a specialized antenna and radio receiver used to detect radio waves from astronomical radio sources in the sky.
Radio telescopes are the main observing instrument used in radio astronomy, which studies the radio frequency portion of the electromagnetic spectrum emitted by astronomical objects, just as optical telescopes are the main observing instrument used in traditional optical astronomy which studies the light wave portion of the spectrum coming from astronomical objects.
[wiki]

Which astronomical object are you aiming to study?
Initially, I aim to study the Hydrogen Line (also known as the 21-centimeter line) emitted by the Milky Way.
This spectral line provides crucial insights into the distribution and movement of hydrogen gas within our galaxy.
Additionally, the radio telescope will be designed for versatility, allowing for easy adaptation to explore other frequencies and analyze various celestial objects.
[wiki]

How will the radio telescope be constructed?
The construction phase of the radio telescope will be divided into two parts. In the first part, it will be built using technologies already available on the market and accessible to the public. This is to assess both the feasibility of subsequent steps and to become familiar with the world of radio astronomy through devices that have already been tested. In the second phase, I will replace some of these technologies with devices designed and built by myself. This way, I should be able to also verify the difference in quality of the radio signals I receive with my devices compared to those already available on the market.

What is the key objective you aim to achieve?
The objective of this project is to create a relatively cost-effective radio telescope capable of yielding scientifically valid and interesting results.
Additionally, as the project originated from reading "Basics of Radio Astronomy for the Goldstone-Apple Valley Radio Telescope," a document from NASA dated April 1998, some of the goals will involve applying the physics and engineering principles learned from that document.