



Plotting the spiral structure and rotational velocity curve of Milky Way Galaxy using a 2.3 m radio telescope

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The aim of this short experiment is to show that the rotational velocity curve and the spiral arms of the Milky Way Galaxy can be plotted using a small 2.3m radio SALSA telescope in Onsala Space Observatory, Sweden remotely operated at 1420 MHz using frequency switching mode and hence it serves as an excellent educational tool to introduce undergraduate students to radio astronomy. The telescope took observations from galactic longitude 0° to 250° at the galactic plane. Using the velocity components of the hydrogen clouds located at different galactic longitudes, as a function of distance from the centre of the galaxy, the spiral arms were plotted. The results of the experiment have been found to be in good agreement with the standard values. The Comparison we use of (Clemens, 1985) plotted rotational curve. We can conclude that the curves are similar in nature and rightly depict the anomaly in behaviour of rotational velocity of the milky way. Upon further analysis we also note that due to lower resolution as well as other constants of SALSA radio telescope, we can see major dissimilarity in near galactic centre readings. Nevertheless, for higher galactic radii, the graph plotted using SALSA in Fig.1(b) matches fairly well with the widely accepted results. Hence, we can assume that even smaller radio telescopes can give considerable results making them an excellent tool for learning and visualising the discovered anomalies and fundamental concepts in radio astronomy. The SALSA telescope is therefore an excellent educational tool and well suited for a preliminary study such as this experiment.

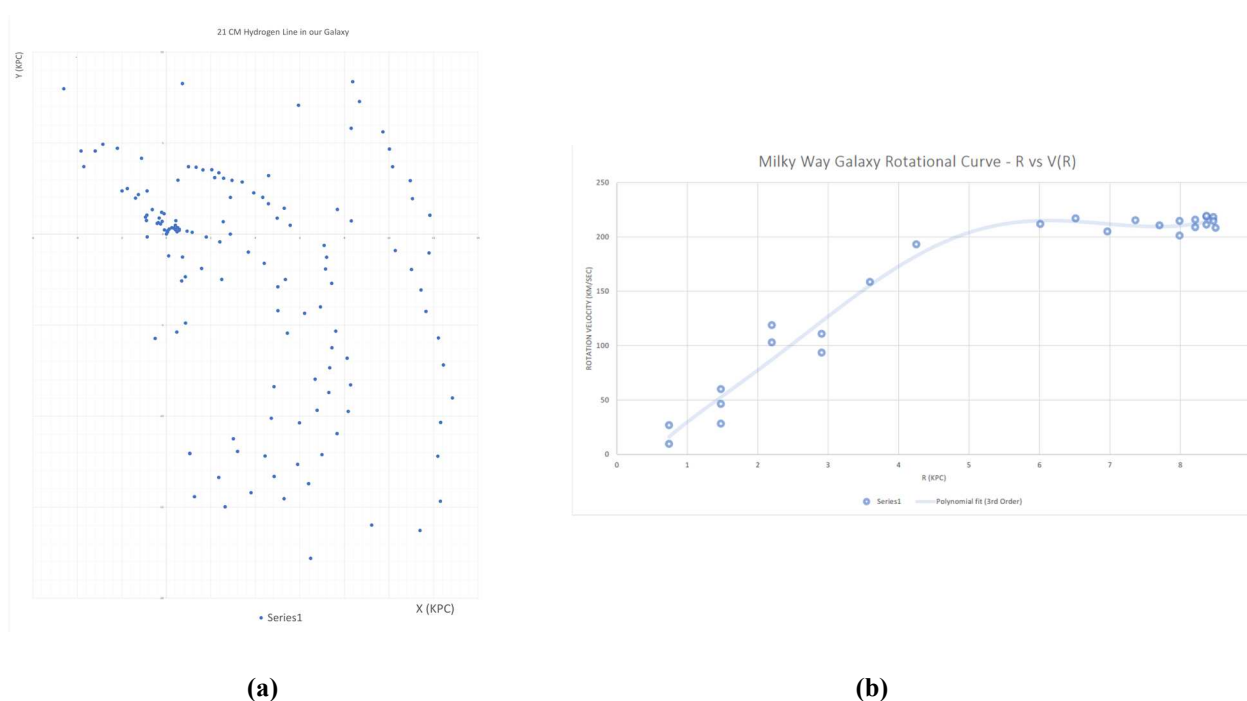


Figure 1. (a) Spiral arms of the Milky Way Galaxy plotted by calculating x and y coordinates from velocity of hydrogen clouds. Origin represents the centre of the galaxy while the coordinate (0,8) represents the position of the Sun. **(b)** Rotational Curve of Milky Way plotted using values from. It is observed that the rotational curve is flat,because the mass in the Milky Way is distributed across the galaxy, the rotation curve does not follow the Keplerian case, as it would if all the mass was to be in the centre.