Mapping the Extent of Neutral Hydrogen Cloud Near Sagittarius A* at 1420 MHz

Sundheim, Elizabeth (School: Berthoud High School)

Neutral hydrogen is abundant in the Milky Way, making its radio emissions at 1420 MHz a key tool for mapping the distribution of matter within the Galaxy. Because the center of the Galactic disk shines so brightly at this frequency, clouds of relatively cool and dense hydrogen gas between the center and the observer can be seen as reductions in signal strength, indicating where energy was absorbed. Using a 16 foot parabolic antenna, drift scans of the sky near Sagittarius A* were completed in order to generate an estimate of original strength of the signal as well as a smaller observed value. The difference between these two values was reduced to a one-dimensional characteristic of absorption depth using a Python program. Absorption depth was plotted in order to generate an image of a cloud of neutral hydrogen slightly offset from the Galactic center.

Awards Won:

Fourth Award of $500