

The GBT Diffuse Ionized Gas Survey (GDIGS): Discrete Sources

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The Green Bank Telescope (GBT) Diffuse Ionized Gas Survey (GDIGS) is a large survey of the Galactic midplane in radio recombination line (RRL) emission. Within the GDIGS survey zone of $32.3^\circ > l > -5^\circ$, $|b| < 0.5^\circ$ lie ~ 2700 HII regions and HII region candidates. Here, we use GDIGS data to identify the correct velocity of 39 HII regions that have multiple RRL velocity components. We also identify and characterize RRL emission from 88 HII regions that previously lacked measured ionized gas velocities, RRL emission from eight locations that appear to be previously-unidentified HII regions, and 41 locations of discrete RRL emission that do not appear to be HII regions based on their lack of mid-infrared emission. In addition, we find 10 discrete sources that have anomalously high RRL velocities for their locations in the Galactic plane. These sources do not have the expected mid-infrared emission characteristic of HII regions. Based on a comparison of our RRL data of these sources with ^{13}CO , HI, and mid-infrared observations, we do not think they are HII regions, and we speculate on the origin of their RRL emission.