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Search for the GeV Counterpart of PeVatron LHAASO J1912+1014u using Fermi-LAT and FUGIN CO Data

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LHAASO reported 43 ultra-high-energy sources that are either proton or electron PeVatrons (Cao+24), and multi-wavelength data are crucial for determining particle species and the CR energy density of the source. In this project, we study the LHAASO J1912+1014u (and HESS J1912+101) region using Fermi-LAT and FUGIN CO data to investigate the “proton PeVatron” scenario. We analyzed 15 years of Fermi-LAT data in 400 MeV to 400 GeV. We improved the standard Fermi-LAT diffuse model by adding a template to reduce large residuals around the source in 1-10 GeV. We found a significant signal in excess of the diffuse model that may represent the >10 GeV emission of the LHAASO/H.E.S.S. source. We also found that 12CO maps with velocities of about 60 km/s (Su+17) and 25 km/s (Sano+18, Sano+ in preparation) represent the excess emission better than a simple Gaussian model, indicating that proton acceleration is a feasible scenario. In this contribution, we present the details of the analysis and its implications for the object.

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