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HESS J1858+020: A GeV-TeV source possibly powered by CRs from SNR G35.6-0.4

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The supernova remnant (SNR) G35.6−0.4 shows a non-thermal radio shell, however, no gamma-ray or X-ray counterparts have been found for it thus far. One TeV source, HESS J1858+020, was found near the SNR and this source is spatially associated with some clouds at 3.6 kpc. With the Fermi-LAT analysis, we found a hard GeV source (SrcX2) that is spatially coincident with both HESS J1858+020 and a molecular cloud complex at 3.6 kpc. In addition, a soft GeV source (SrcX1) was found at the northern edge of the SNR. The GeV spectrum of SrcX2 connects well with the TeV spectrum of HESS J1858+020. The entire gamma-ray spectrum ranges from several GeV up to tens of TeV and it follows a power-law with an index of ~2.15. We discuss several pieces of observational evidence to support the middle-aged SNR argument. Using runaway CRs from the SNR, our hadronic model explains the GeV-TeV emission at HESS J1858+020, with a diffusion coefficient that is much lower than the Galactic value.

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