

Understanding the Extreme Afterglow of GRB 221009A in a Photohadronic Framework

Content

We present an analysis of the very-high-energy observations of the exceptional long-duration gamma-ray burst GRB 221009A performed by the H.E.S.S. telescopes starting 53 hr after the trigger. Although no significant VHE emission was detected during the observations on 2022 October 11, 12, and 17, flux upper limits were derived under challenging atmospheric conditions. Using the photohadronic model, we show that these upper limits are naturally explained by interactions of high-energy protons with synchrotron seed photons in the forward-shock region of the GRB jet. This study highlights the role of hadronic processes in interpreting late-time VHE observations of powerful GRBs.

Summary

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