

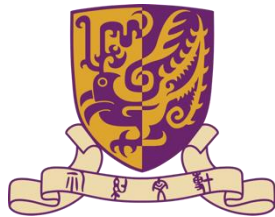
Secondary Electron-Positron Pairs as a Key Component of the Solar Disk TeV Emission

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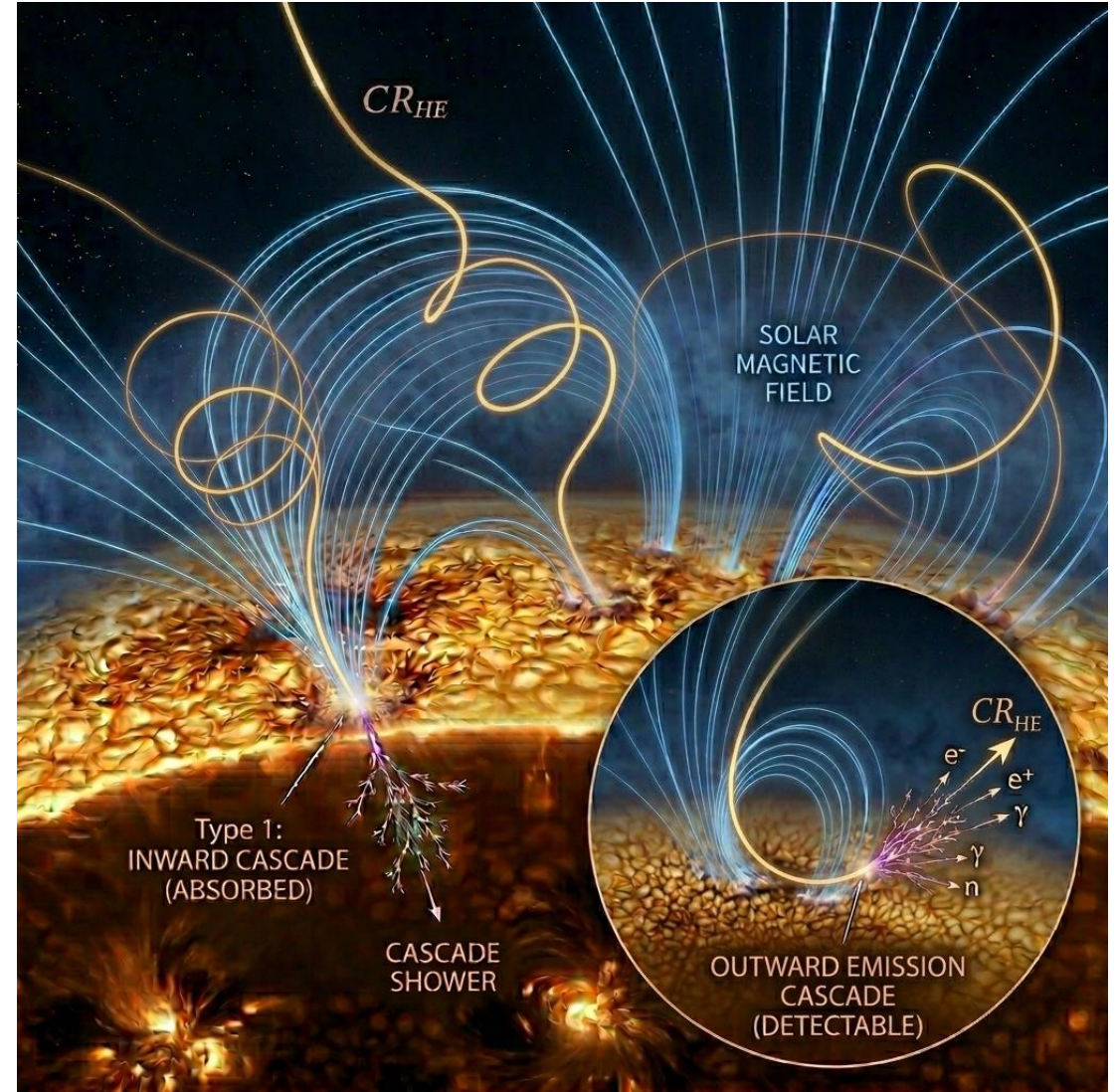
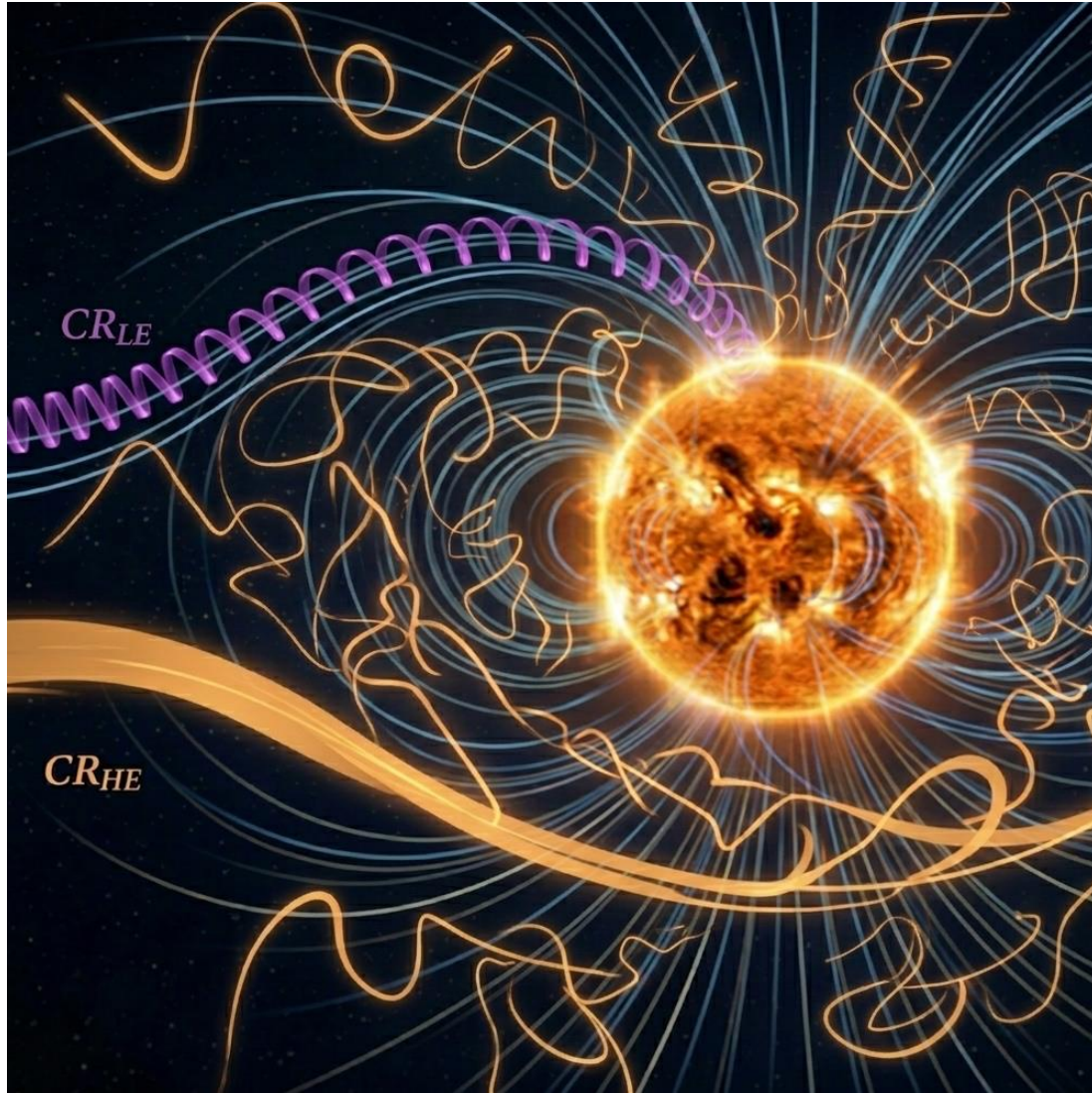


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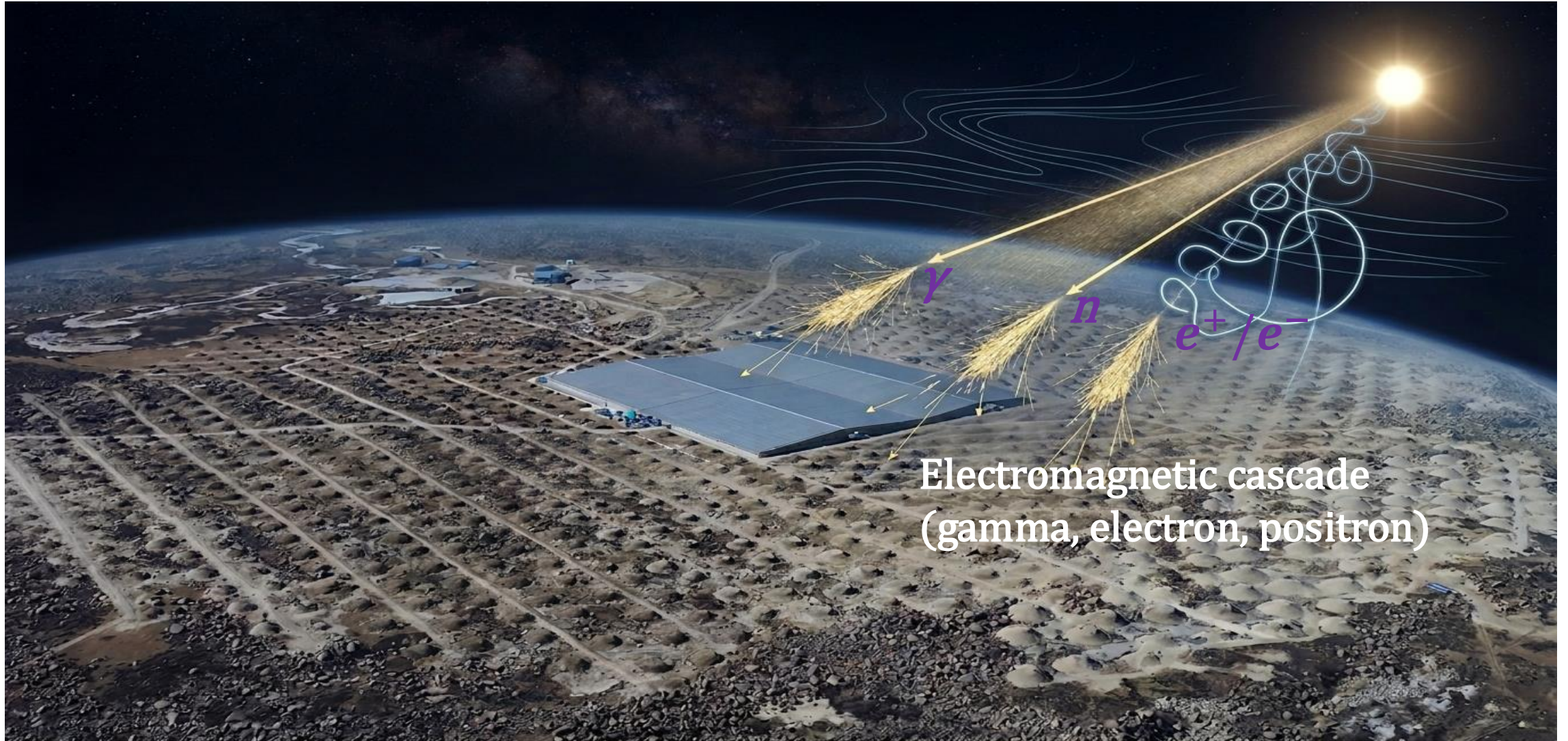
Outline

- **Motivation & Background**
- **G4Solar Simulation**
- **Results**

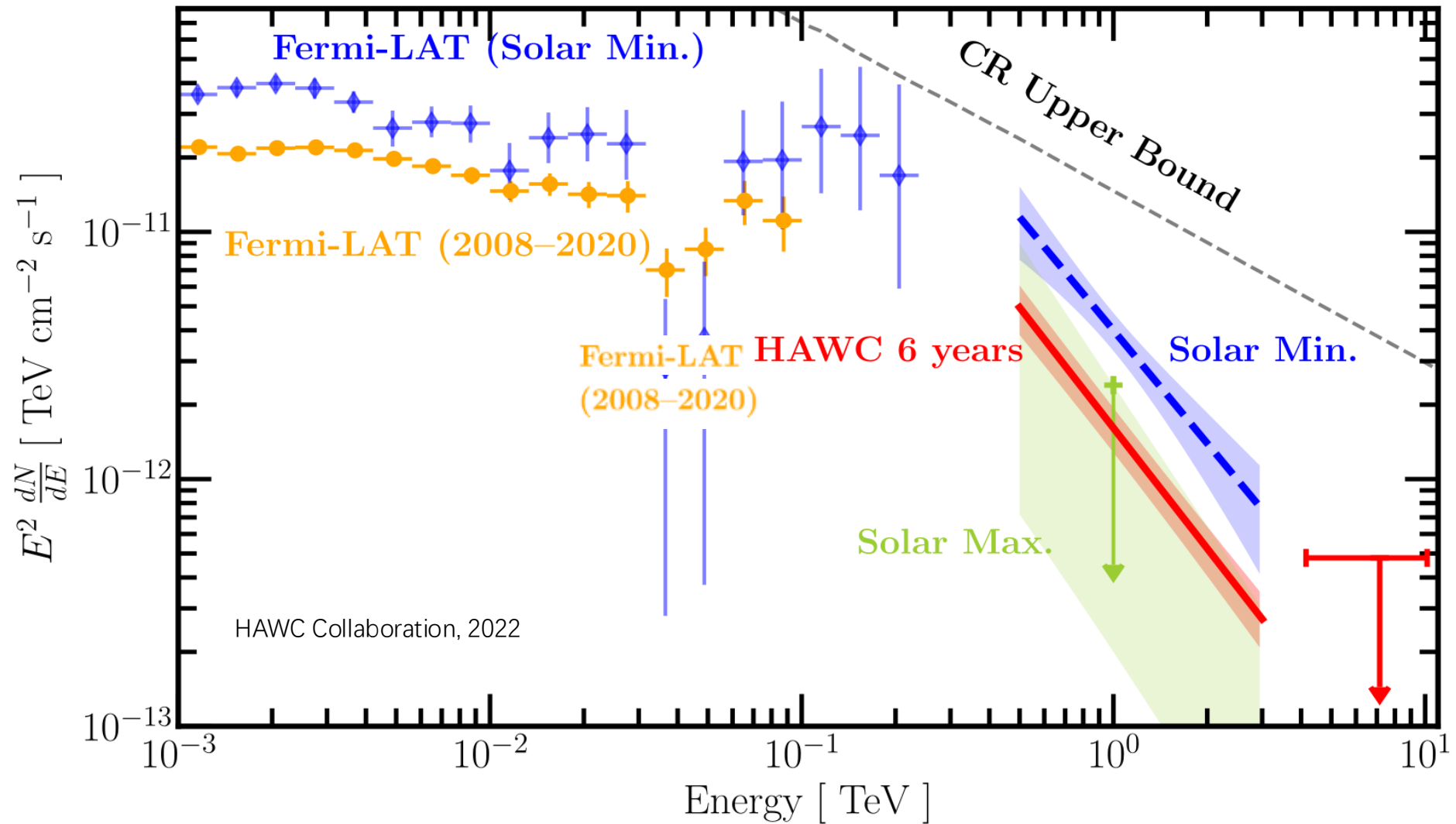
Motivation & Background



Motivation & Background



Motivation & Background

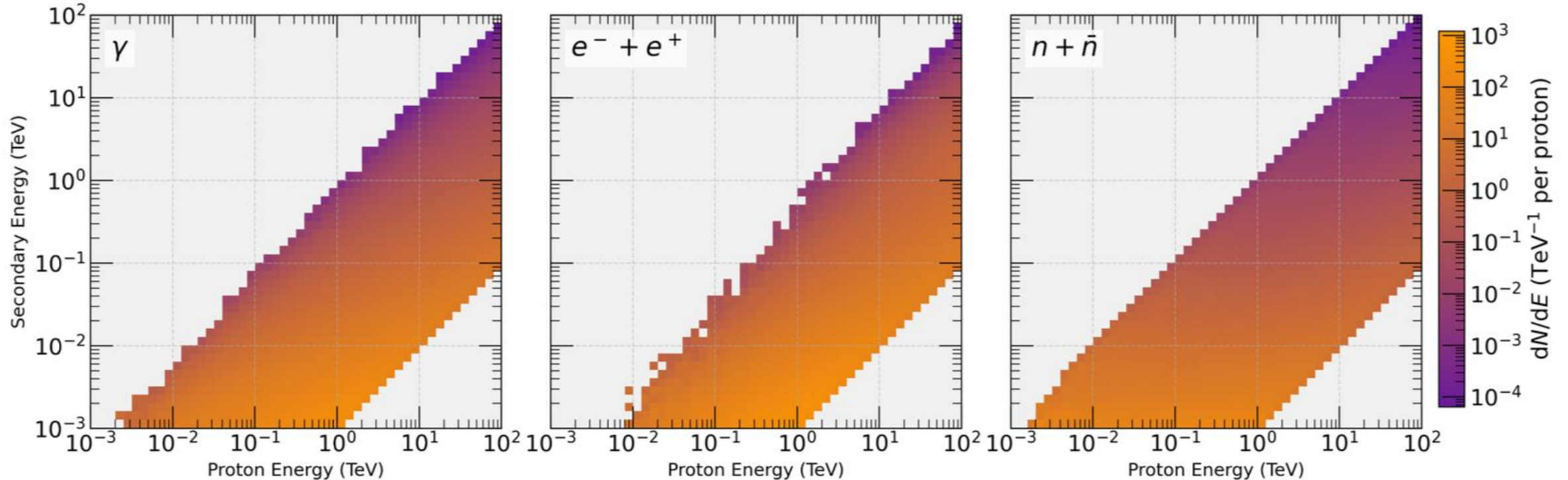


Phys. Rev. Lett. **131**, 051201, HAWC Collaboration

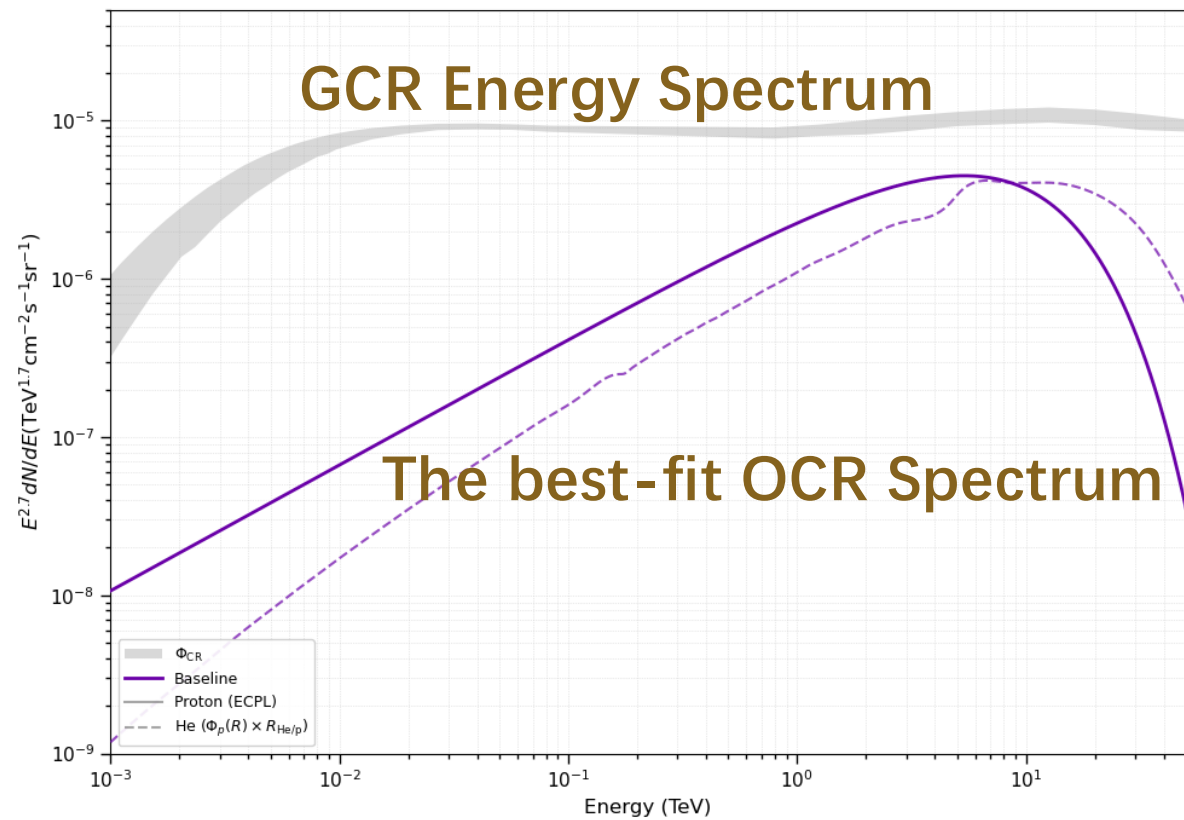
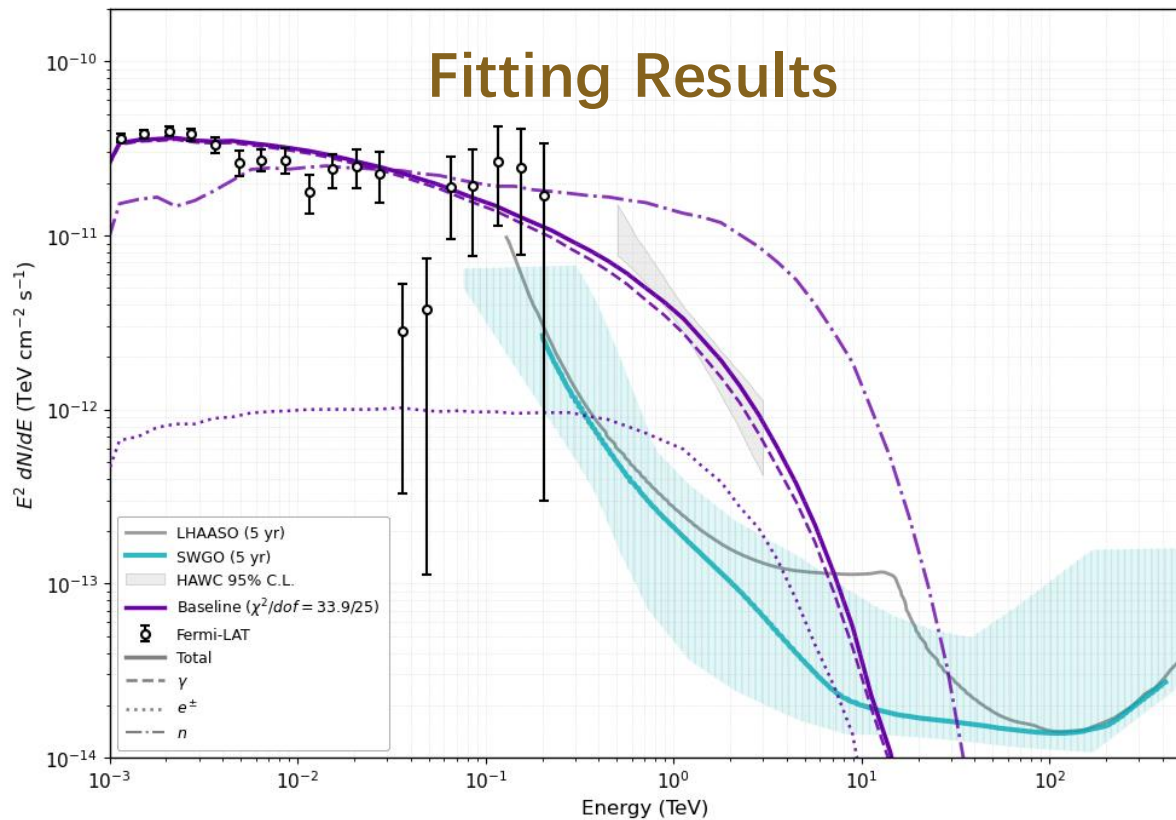
G4Solar Simulation

Main Assumptions:

CR are deflected by the B field and emitted outward from a specific **Depth** within the Sun with a specific **Spectrum** and **Angular Distribution**. We refer to such cosmic rays as **Outward CRs (OCRs)**.



Results



Results

- We simulated and successfully fitted the Fermi and HAWC observations of solar gamma rays, and inferred the energy spectrum of the outward-deflected cosmic rays at the solar surface.
- Our simulations indicate that the electron-positron signal accounts for approximately $\sim 20\%$ of the total observed signal.
- We predicted the energy spectra of solar secondary electrons, positrons, and neutrons at Earth. These signals are expected to be detected by future detectors such as LHAASO and VLAST.

