



# Fermi

Gamma-ray Space Telescope

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**Mission Status Update  
December 14, 2022**

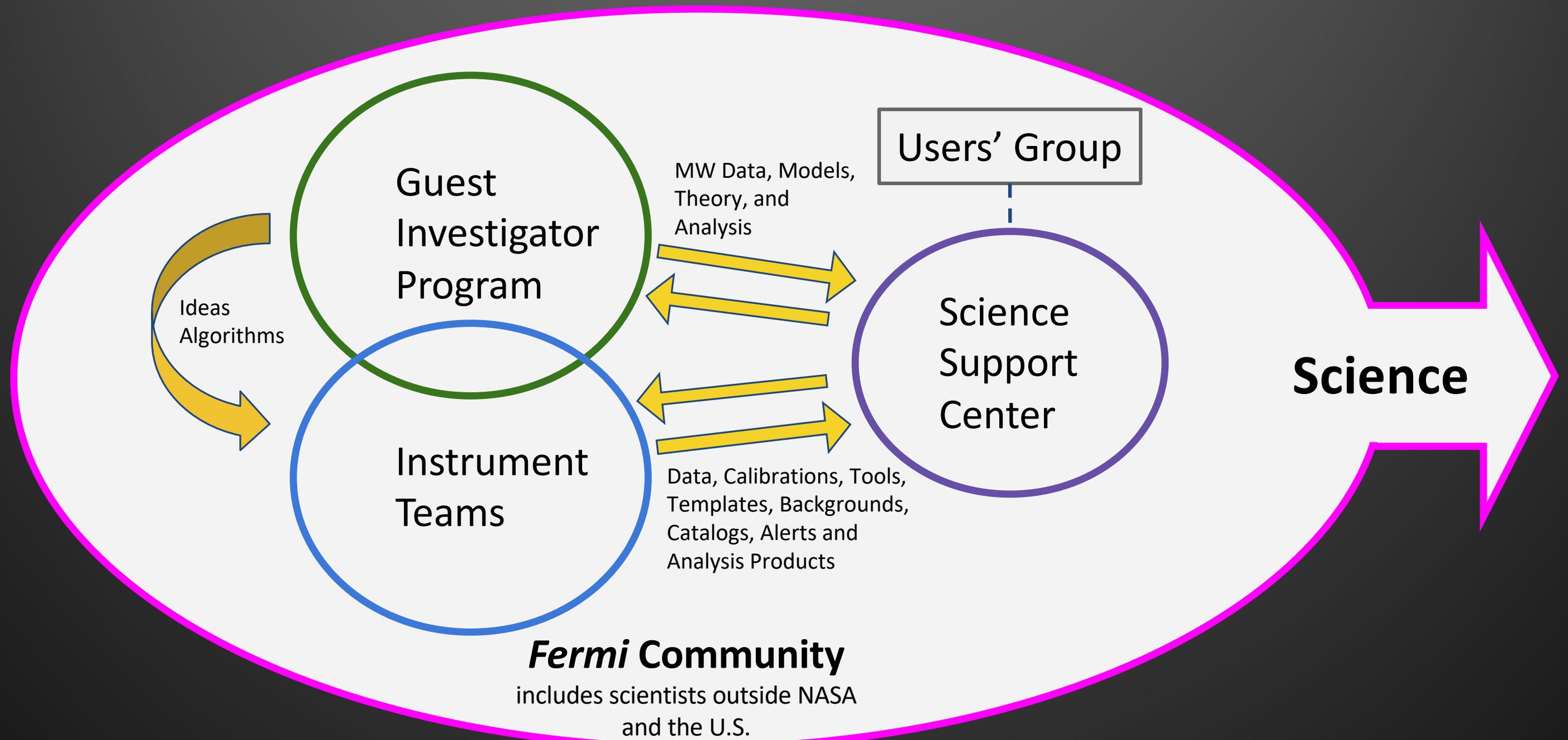
**E. Hays, J. Racusin**

# Updates from the Project

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- **Senior Review 2022**
- **Status and Plans**
  - **Observatory operations**
  - **Science support activities**
  - **Press and Outreach**

# *Fermi* achieves science objectives through community-driven efforts supported by the teams



# Senior Review 2022: Fermi Mission is extended!

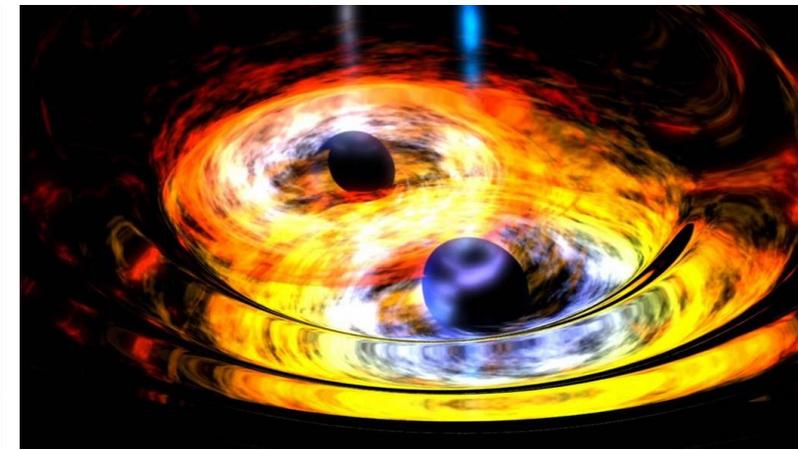
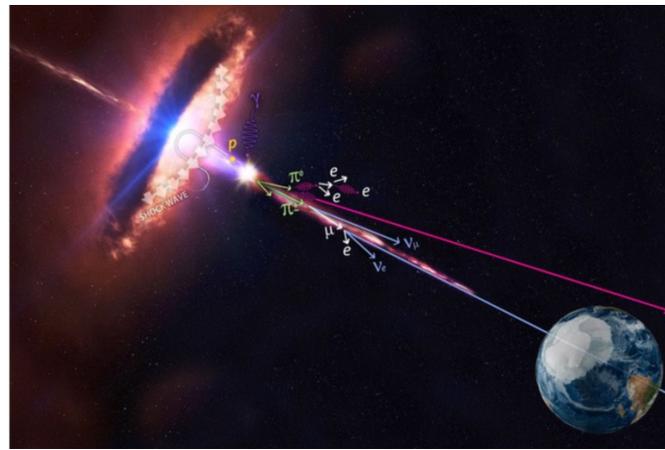
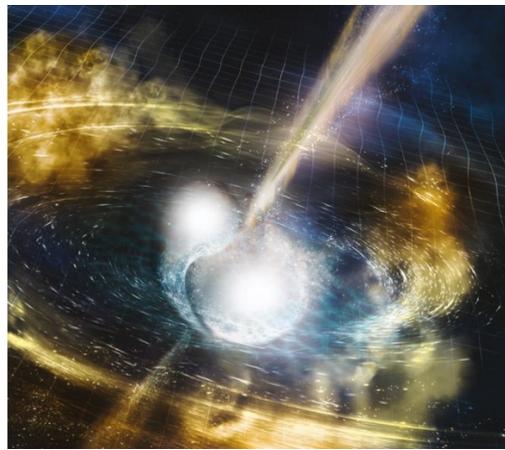
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- The panel report recognized Fermi's critical role in astrophysics and its strong support of the user community.
  - “Fermi provides unique access to the gamma-ray portion of the electromagnetic spectrum and the largest simultaneous field-of-view of any space telescope. Its data give us a time-domain view of the entire gamma-ray sky and are a crucial asset for gravitational-wave and multi-messenger astrophysics.”
  - “Strong synergies with other surveys, in particular new surveys that represent new technical capabilities, has and will continue to be a significant strength of the Fermi mission.”
  - “The usability of Fermi data and user support for data analysis are strong.”
- Mission Extension covers FY23 - FY25 with guidelines for FY26 - FY27 subject to the next Senior Review in 2025.
- [Rest of Missions Panel Report link](#)
- [APAC Subcommittee Report link](#)

Thank you for your help and support!

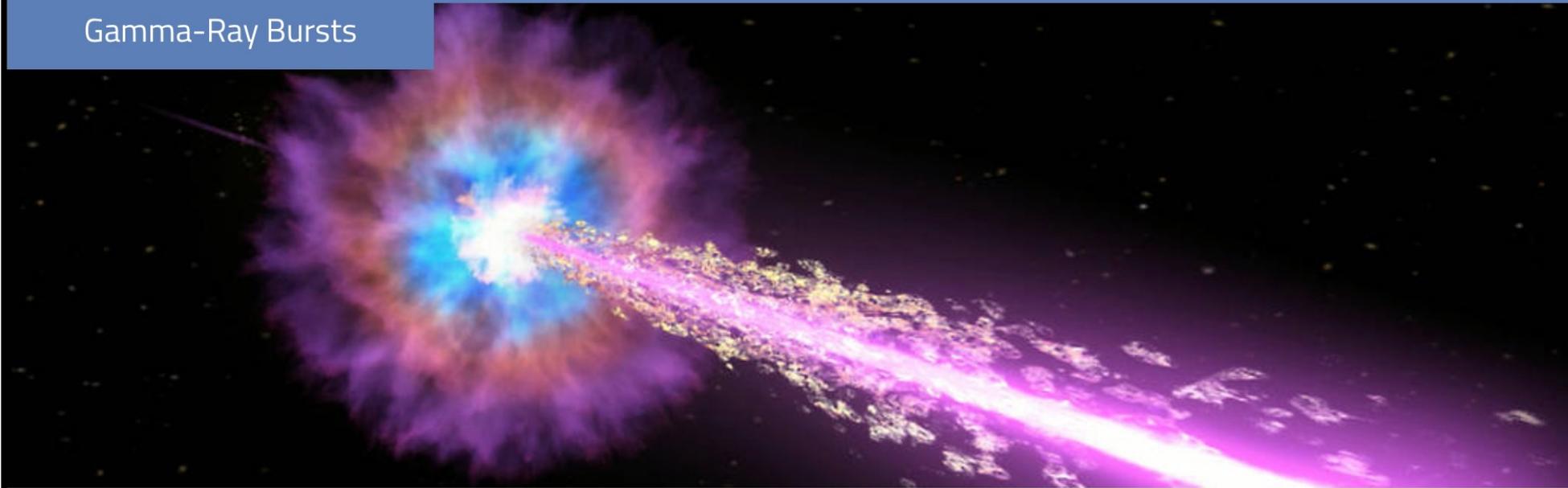
# Senior Review

- **Mission science objectives leverage Fermi's unique roles in multimessenger and time-domain astrophysics**
  - **Exploring multi-messenger sources – sources of both gravitational waves and neutrinos, and with Fermi as a gamma-ray pulsar timing array to detect low frequency GW**
  - **Capitalizing on big surveys from radio to optical and beyond**
  - **Modeling the high energy universe to probe the workings of AGN, GRBs and PeVatrons**
- **Fermi capabilities are key for making new discoveries within the Astro2020 Decadal Survey theme of *New Messengers and New Physics***



# Big news from October

## Gamma-Ray Bursts



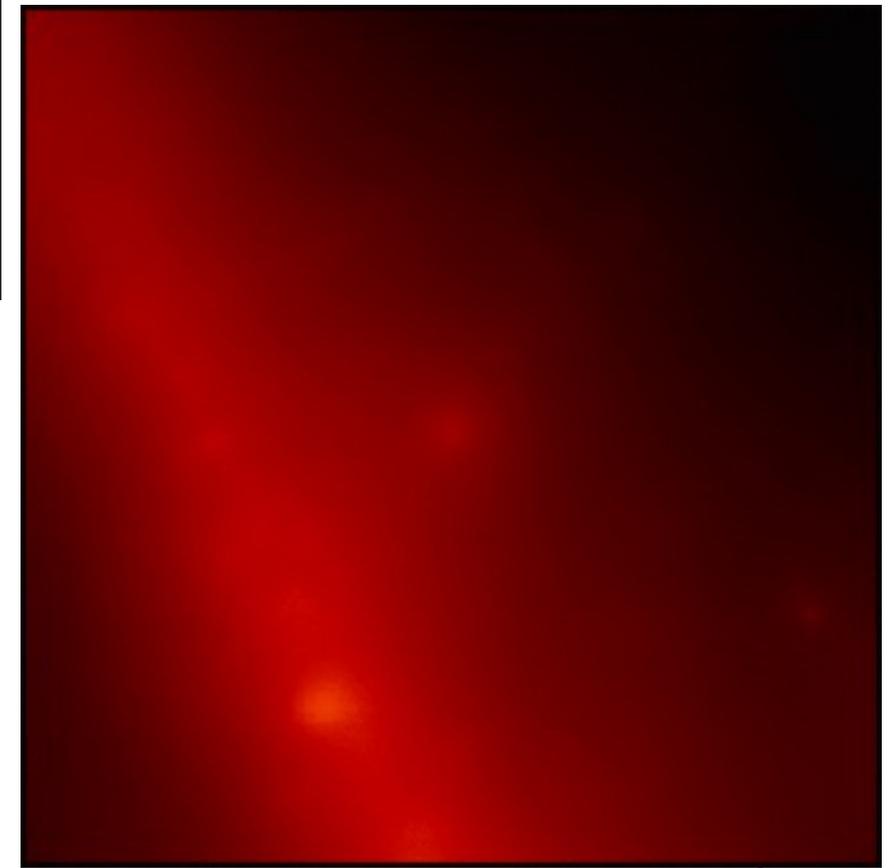
Oct 13, 2022

## NASA's Swift, Fermi Missions Detect Exceptional Cosmic Blast

NASA content included in an Agence-France-Presse report that appeared on many outlets, including Voice of America, Barron's, Jakarta Post, and Bangkok Post. Pickups from CNN, ArsTechnica, BigThink, Forbes, Space.com, Mashable, SciTechDaily, Science Times, IFLScience, IndiaToday, Physicsworld, New Atlas, Futurism, Interesting Engineering, and additional stories in Croatian, French, Dutch, German, Indonesian, Italian, Korean, Polish, Portuguese, Romanian, Russian, Spanish, Turkish, and Vietnamese.

The brightest burst ever – GRB 221009A! And then an outburst of media!

LAT movie was also on APOD for October 14. It was viewed 77,000 times (not including mirror sites).



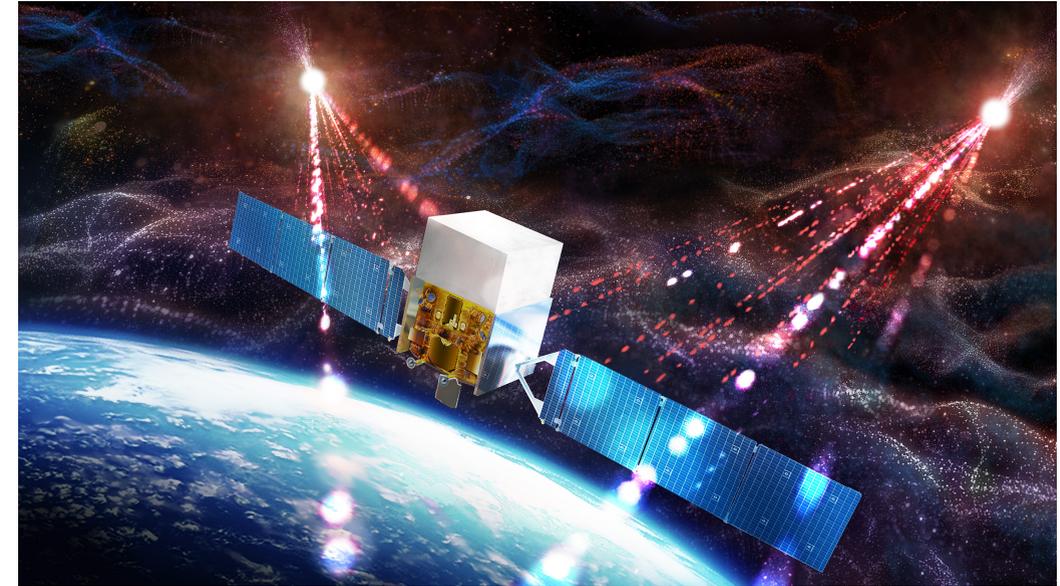
# Observatory Status Highlights

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- **Spacecraft**
  - **Normal operations. No current areas of concern.**
- **Observations**
  - **Observation strategy unchanged -- mix of traditional, asymmetric, and sine-modified survey. Pointed observations have been discontinued since 2018.**
  - **Prep for O4 gravitational wave observation run**
    - **SAA boundary reductions: updated by LAT in January; in study by GBM. Small increase in time that instruments are collecting data and active for GRB triggers.**
- **FOT/engineering highlights**
  - **OS upgrades**
  - **No maneuvers since 2012, but experiencing a higher rate of collision avoidance planning than in the past. Keeps operations busy.**
    - **Planning process streamlined**
    - **Constraints removed, e.g. instruments can now remain on during a maneuver.**
    - **Study in progress to assess feasibility of slightly raising the observatory orbit.**

# Recent Press Activity

- [NASA's Fermi Hunts for Gravitational Waves From Monster Black Holes](#) – April 2022
- [NASA's Fermi Confirms Star Wreck as Source of Extreme Cosmic Particles](#) – August 2022
  - Video explainer [available on YouTube](#)
- [NASA's Swift, Fermi Missions Detect Exceptional Cosmic Blast](#) – October 2022
- [NASA Missions Probe Game-Changing Cosmic Explosion](#) – December 2022
- **Plans for upcoming releases**
  - **Gamma-ray Eclipses in Black Widow & Redback Millisecond Pulsar Binaries**
  - **Third Pulsar Catalog**
- **Got an exciting result? Let us know before submitting!**
  - **Talk to science group coordinators and contact Judy Racusin ([Judith.racusin@nasa.gov](mailto:Judith.racusin@nasa.gov)), Dave Thompson ([David.J.Thompson@nasa.gov](mailto:David.J.Thompson@nasa.gov)) and/or Frank Reddy ([Francis.J.Reddy@nasa.gov](mailto:Francis.J.Reddy@nasa.gov))**



# Outreach and Social Media

- **@NASAUniverse on Twitter & Facebook**
- **Social media posts using #FermiFriday content, special days, interesting results, promoting press releases, and #FermiPeople**
- **Fermi @ 15**
  - **The Fermi Comms team is planning now for Fermi's 15<sup>th</sup> anniversary**
    - **Ideas welcome!**
- **Fermi Social Media regular contributors: Tiffany Lewis, Dave Thompson, Judy Racusin, NASAUniverse staff**
- **Your suggestions for future social media content are welcome**
  - **Contact [Judith.racusin@nasa.gov](mailto:Judith.racusin@nasa.gov) or [@jracusin](https://www.instagram.com/jracusin) on Slack**

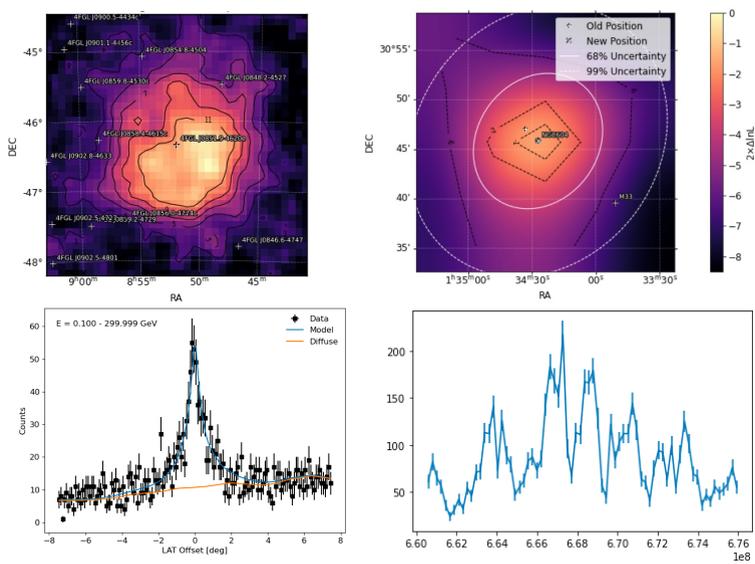


# Fermi Summer School 2022



The University of Delaware and the Fermi Mission hosted the Fermi Summer School in Lewes, Delaware, from May 31 to June 10. This annual gamma-ray analysis workshop for early-career researchers had not been held in-person since 2019.

Next school: May 30 - June 9, 2023



Analysis tutorial sessions



Lectures on gamma-ray and multimessenger astrophysics



Muon detectors reveal cosmic-ray air showers

10<sup>th</sup> International Fermi Symposium, October 2022  
Johannesburg, South Africa



**News! 11<sup>th</sup> Fermi Symposium planned for DC area in late 23/early 24.**

# Meetings and Events

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- **Upcoming**
  - **AAS 240 in Seattle, Washington, Jan. 8 – 12, 2023.**
    - **SSC will host a booth presence**
  - **Fermipy developers' workshop at SLAC January 17-19**
  - **Preproposal workshop for Cycle 16, Jan. 24, 2023, at 2 pm ET**
  - **Virtual Analysis Workshops TBD**
    - **Topical workshops to support developing analysis skills beyond entry level**
      - **Envisioned as a few days of lectures and work sessions combining science applications and techniques**
    - **One workshop will be devoted to transient analysis. Additional topics could cover pulsar or blazar analysis, or other science analysis areas for Fermi studies.**
      - **Ideas? Interested in participating in planning? Contact Liz or Judy.**
  - **11th Fermi Symposium TBD – planning starting now**
    - **Planning will include consideration for virtual participation that was not possible for the 10<sup>th</sup> Symposium**
  - **Fermi @ 15**



# FSSC Activities

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- **LAT/FSSC operations**
  - Routine mission planning, calibration and CCD image dumps.
  - Routine calibration and monitoring of LAT. Support for data transfers and pipeline operations.
- **Data and Catalogs**
  - LAT GRB Catalog Update for bursts following the second catalog (2018)
  - Publication of Improved GRB Localizations from Fermi-GBM
    - <https://zenodo.org/record/6727152>
- **Software**
  - Fermitools: version 2.2.0 released June 21 - [Release notes](#) [Public repository](#)
    - Addresses issues for building and installing tools
  - Optimization – looking at performance of tools and places for improvement
- **GI Program**
  - Cycle 15 selections announced. AO 15 began in August.
- **Community Support**
  - Fermi Summer School: in-person event this summer went well and planned for next summer (May 30 – June 9, 2023.)
  - Planning virtual workshops to support broader community engagement with Fermi analysis.
  - Planning to support the mission booth at AAS 241. (Jan. 8 – 12, 2023).