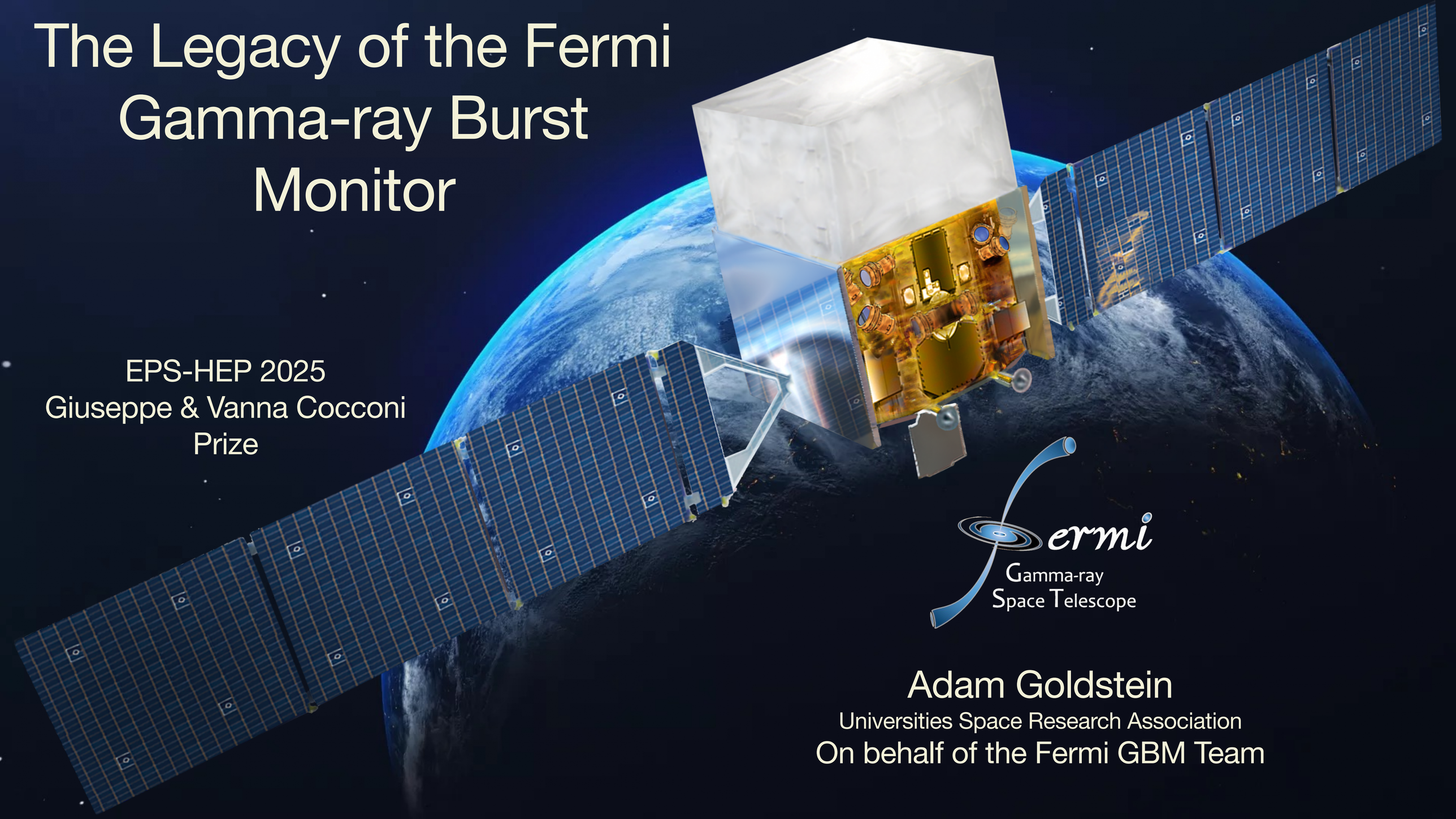
The Legacy of the Fermi Gamma-ray Burst Monitor

EPS-HEP 2025
Giuseppe & Vanna Cocconi Prize

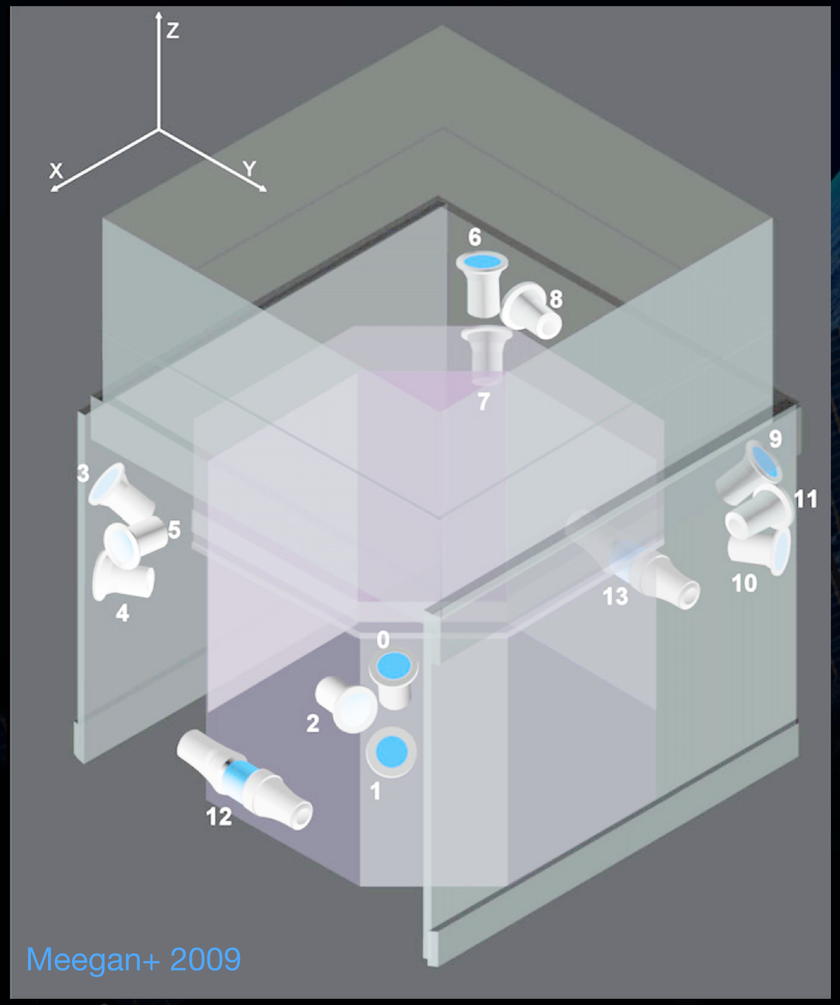


Fermi
Gamma-ray Space Telescope

Adam Goldstein
Universities Space Research Association
On behalf of the Fermi GBM Team

The Fermi Gamma-ray Burst Monitor

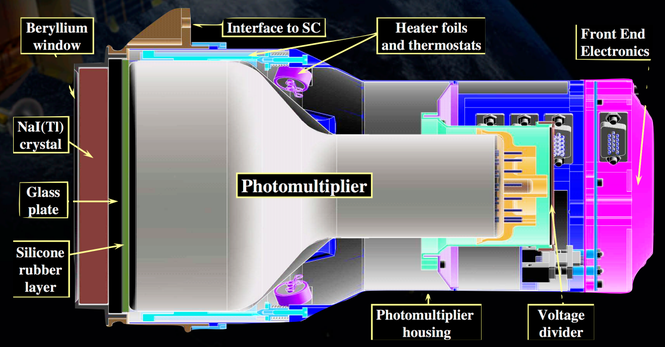
Technology developed in the mid-1940s
and first flown in the 1960s…



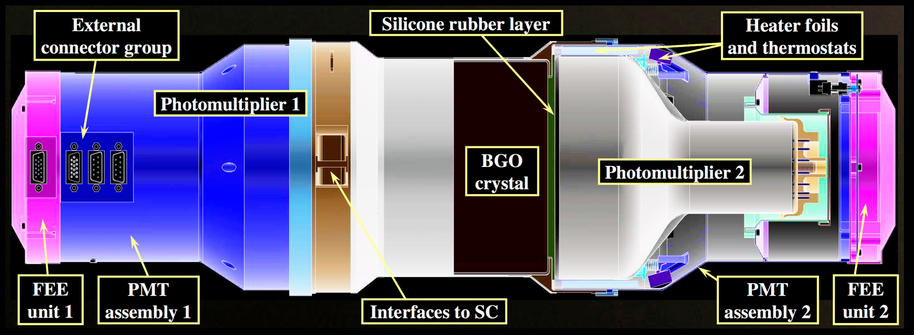
Meegan+ 2009

- 8 keV—40 MeV
- 256 energy channels
- 2 μs resolution
- Instantaneously observes ~70% of the sky
- Localizes transients to few degrees

NaI Detector

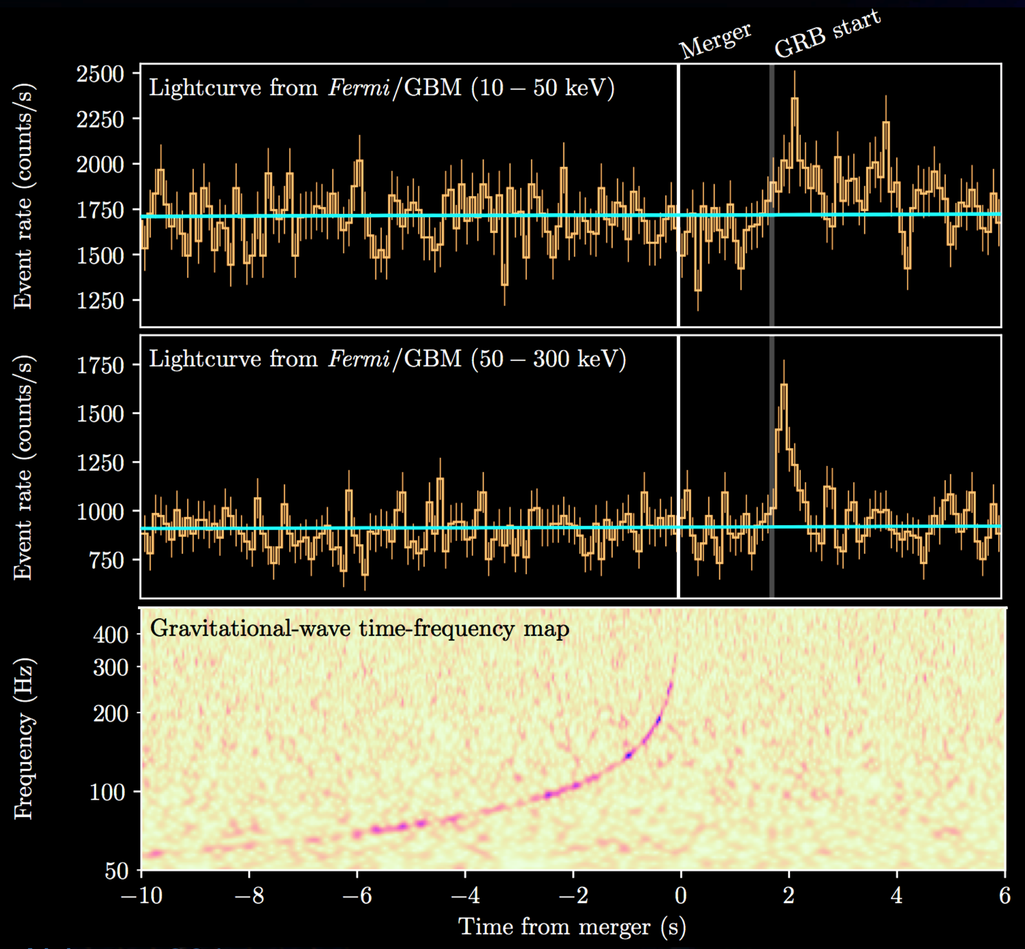


BGO Detector

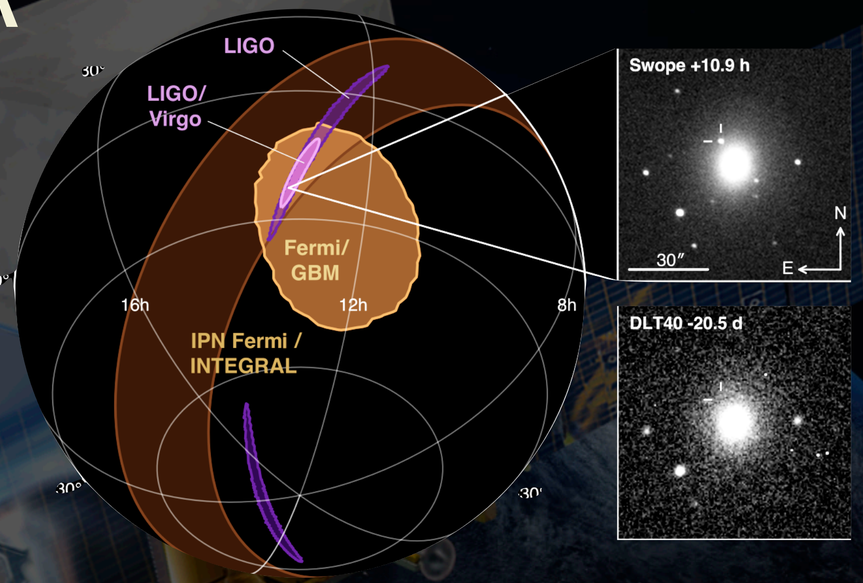


GW170817— GRB 170817A

…still produces groundbreaking science and is unveiling secrets of the universe.



Abbott+ 2017
Goldstein+ 2017

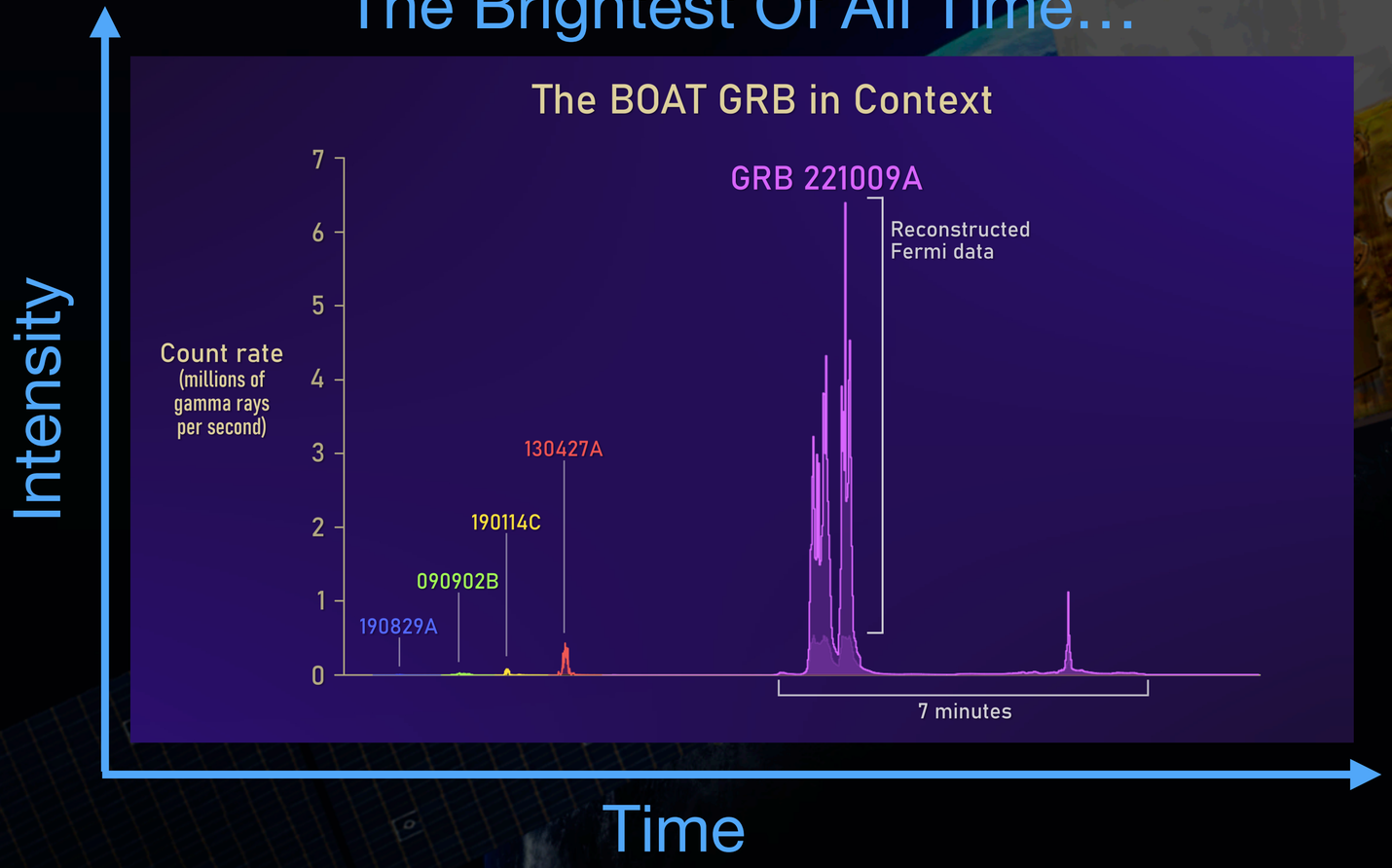


One Event — A Foundational Discovery

- Relativistic Jet Physics
- Fundamental Physics
- General Relativity
- Stellar Populations
- Condensed Matter Physics
- Cosmology
- Nucleosynthesis

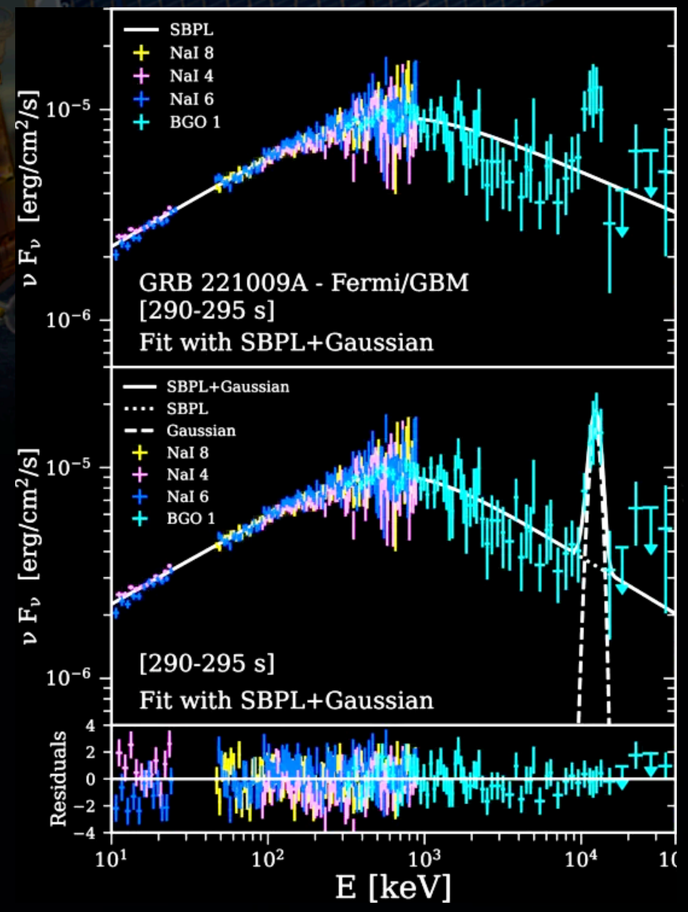
Other Notables

The Brightest Of All Time…



NASA GSFC / Adam Goldstein (USRA)
Lesage+ 2023

…and a spectral line!

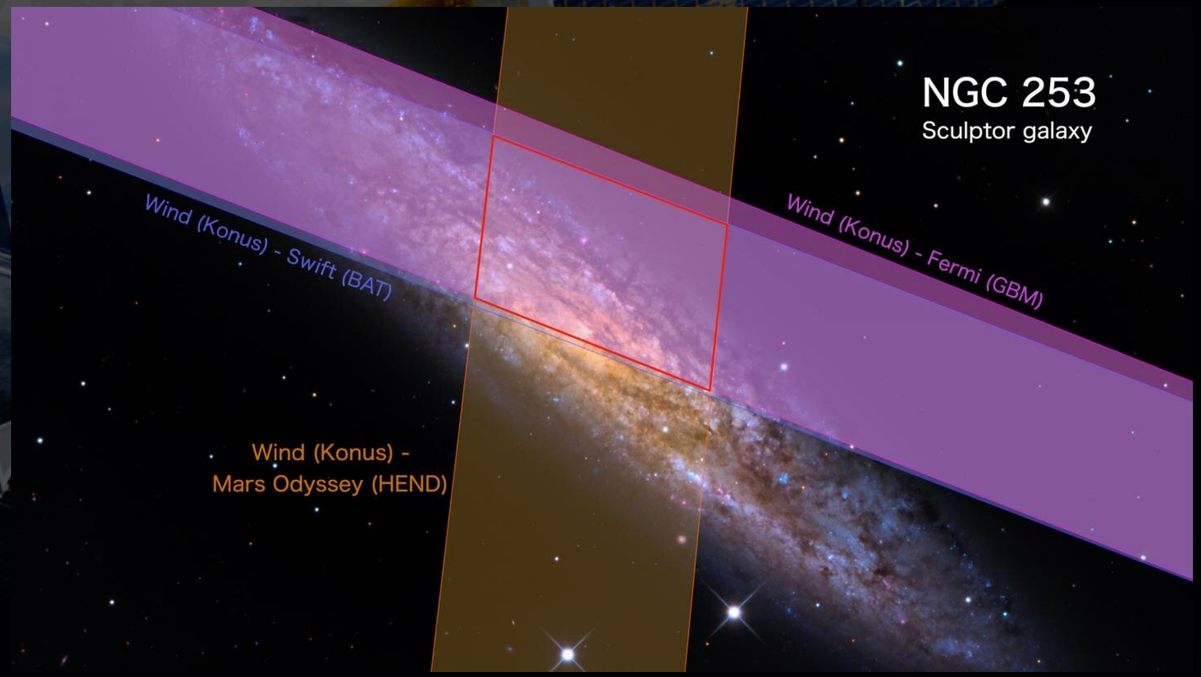


Ravasio+ 2023

Other Notables

Identifying and localizing giant flares from highly magnetized neutron stars

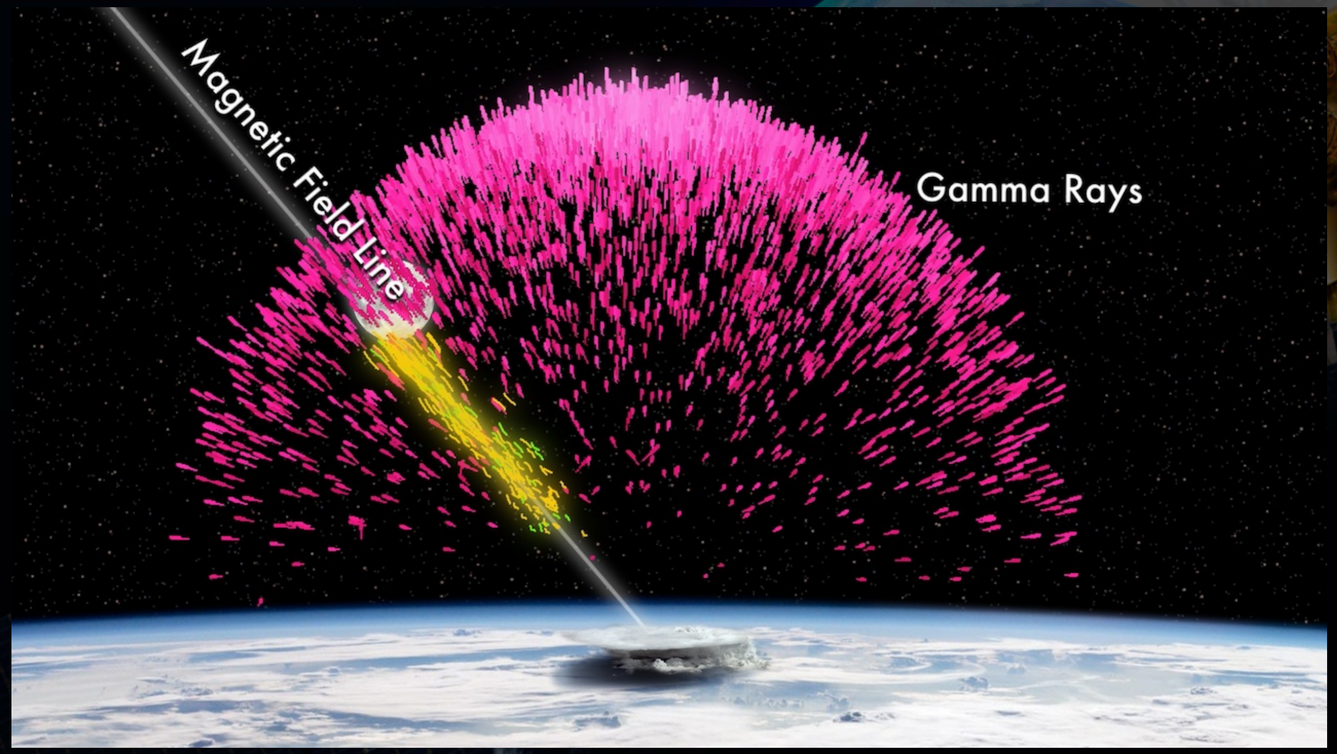
NASA GSFC / S. Weissinger



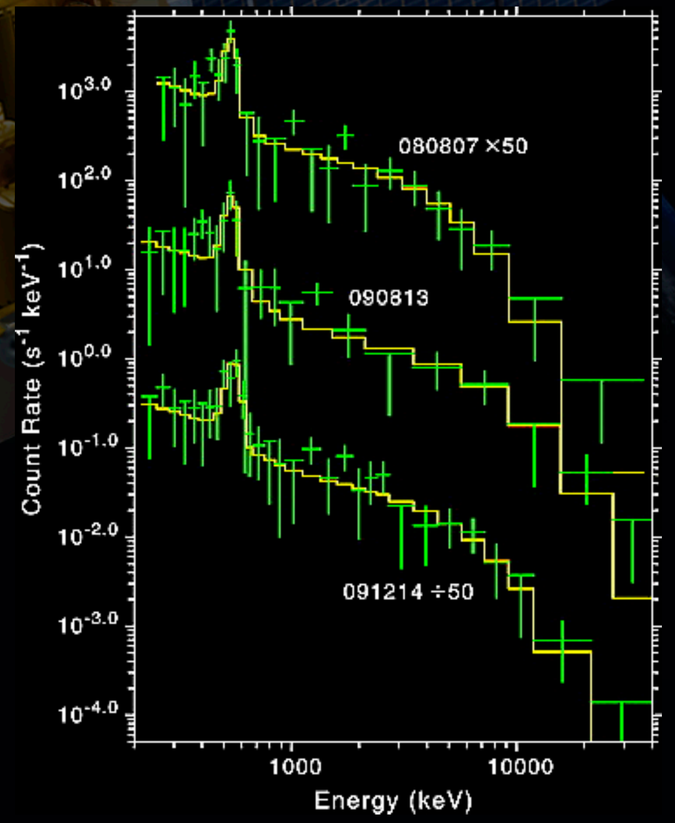
NASA GSFC / Adam Block / Mount Lemmon Sky Center / University of Arizona

Other Notables

Gamma-rays and Positrons from Lightning Storms



NASA



Briggs+ 2011

GBM’s Legacy by the Numbers

- > 4,000 on-board detected GRBs
- ~7,000 reports of community follow-up observations
- > 3 trillion photons collected
- ~500 refereed publications since 2008 involving Fermi GBM
- > 15,000 lines of open-source code for use by future missions
- 7 multi-wavelength/multi-messenger MOUs
- 123 Scientists and Engineers
- 7 countries contributed to science operations
- 17 PhDs graduated (so far)
- Countless discoveries remaining

GBM’s Human Legacy

Suman Bala
Joseph Barber
Francesco Berlato
Fred Berry
Narayana Bhat
Elisabetta Bissaldi
Peter Braunschweig
Mia Bridges
Michael Briggs
J. Michael Burgess
Stephanie Burgess
Eric Burns
Dave Byrne
Choni Camero
Ron Cantrell
Gary Case
Vandiver Chaplin
Bill Cleveland
Audrey Coleman
Danny Coleman
Andrew Collazzi
Valerie Connaughton
Eric Cramer
Marianna Dafčíková
Sarah Dalessi
Cuán de Barra
Bob Dean
Davide Depalo
Roland Diehl
Anne Diekmann
Rachel Dunwoody
Steve Elrod
Al English
Edward Eskew
Mark Finger
Jerry Fishman
Ger Fitzpatrick
Cori Fletcher
Suzanne Foley
Lisa Gibby
Misty Giles
Matt Godwin
Adam Goldstein
Nick Gorgone
Jochen Greiner
David Gruber
Marjorie Gruen
Sylvain Guiriec
Rachel Hamburg
Aldana Holzmann-Airasca
Boyan Hristov
Michelle Hui
Pete Jenke
Erin Kara
Marc Kippen
Dan Kocevski
Chryssa Kouveliotou
Fred Kroeger
Emily Layden
Kathryn Leavitt
Stephen Lesage
Collin Lewin
Gisehler Lichti
Taylor Ligon
Lin Lin
Manu Linares
Tyson Littenberg
Bagrat Mailyan
Christian Malacaria
Joe Mangan
Sheila McBreen
Padraig McDermott
Sinead McGlynn
Charles "Chip" Meegan
Georgia Michelman
Nohely Miranda-Colon
Ava Myers
Eman Moneer
Curran Muhlberger
Oindabi Mukherjee
Eliza Neights
Marz Newman
Ronny Nguyen
Elisabeth Norman
Lindsey Oberhelman
Bill Paciesas
Utkarsh Pathak
Veronique Pelassa
Roberta Pillera
Suraj Poolakkil
Rob Preece
Judy Racusin
Arne Rau
Aakarsh Real
Oliver Roberts
Niall Rogers
Felix Ryde
Eric Schmidt
Lorenzo Scotton
Ryan Seeb
Laura Seward
Vidushi Sharma
John Sharpe
Jacob Smith
Rushikesh Sonawane
Linda Sparke
Matthew Stanbro
Helmut Steinle
Dave Tierney
Kilian Toelge
Aaron Trigg
Alexander van der Horst
Peter Veres
Andreas von Kienlin
Greg Waldschmidt
Robert Wilson
Colleen Wilson-Hodge
Josh Wood
Charity Woodrum
Shaolin Xiong
George Younes
David Yu
Binbin Zhang