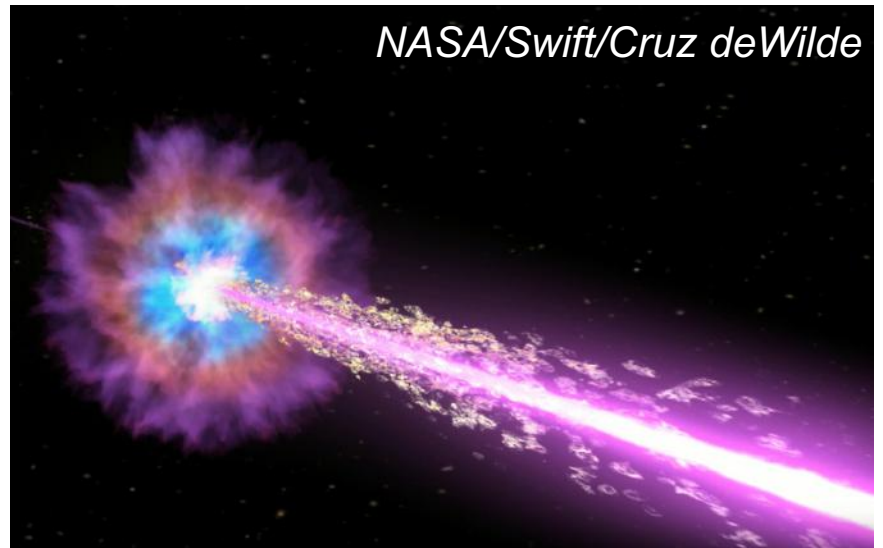


THE PARADIGM-ALTERING JET OF GRB 221009A ("THE BOAT")

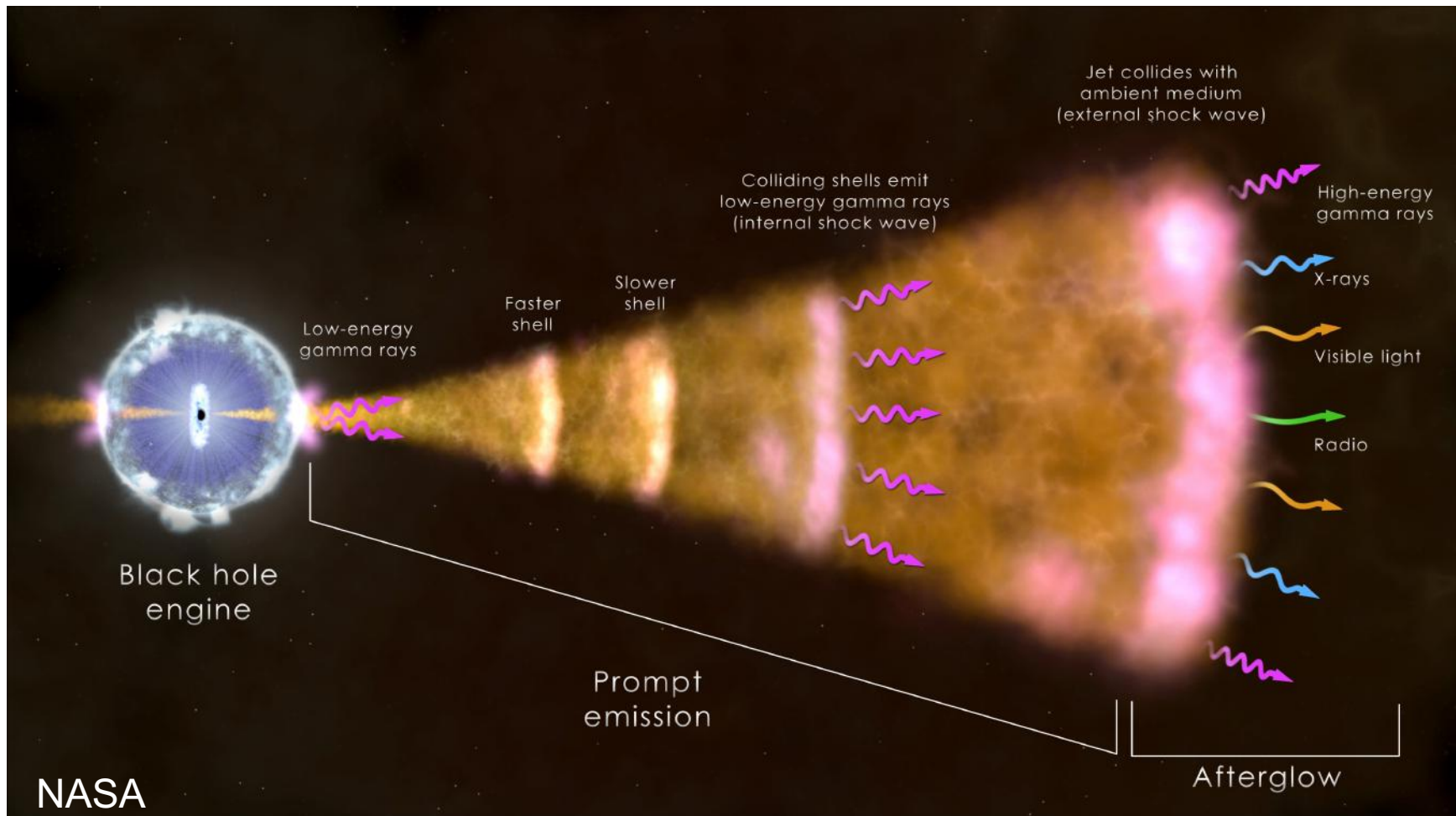
Kate D. Alexander
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March 28, 2023

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- **Jet** = narrow stream of particles moving at near light speed, powered by a newly formed black hole
- **Afterglow** = light produced when the jet runs into its surroundings





Swift
NASA



GMRT
NCRA



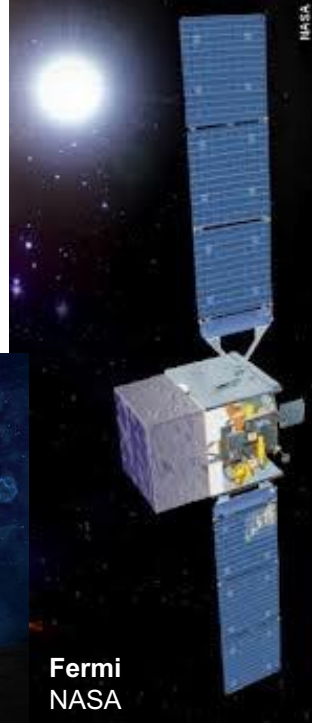
VLA
NRAO



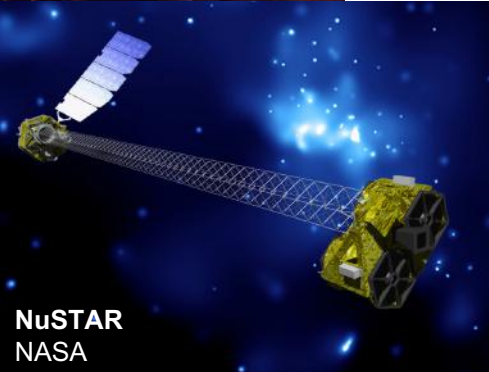
ALMA
ESO



Multi-wavelength observations



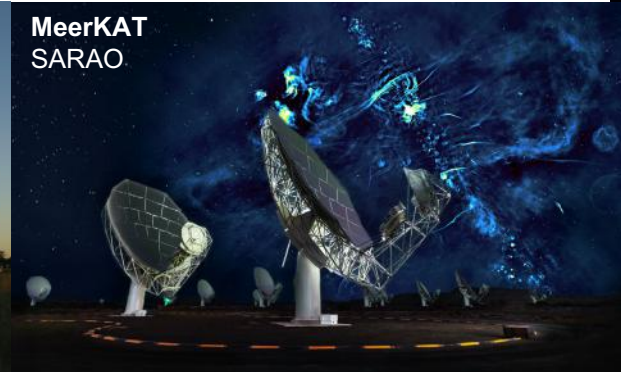
Fermi
NASA



NuSTAR
NASA



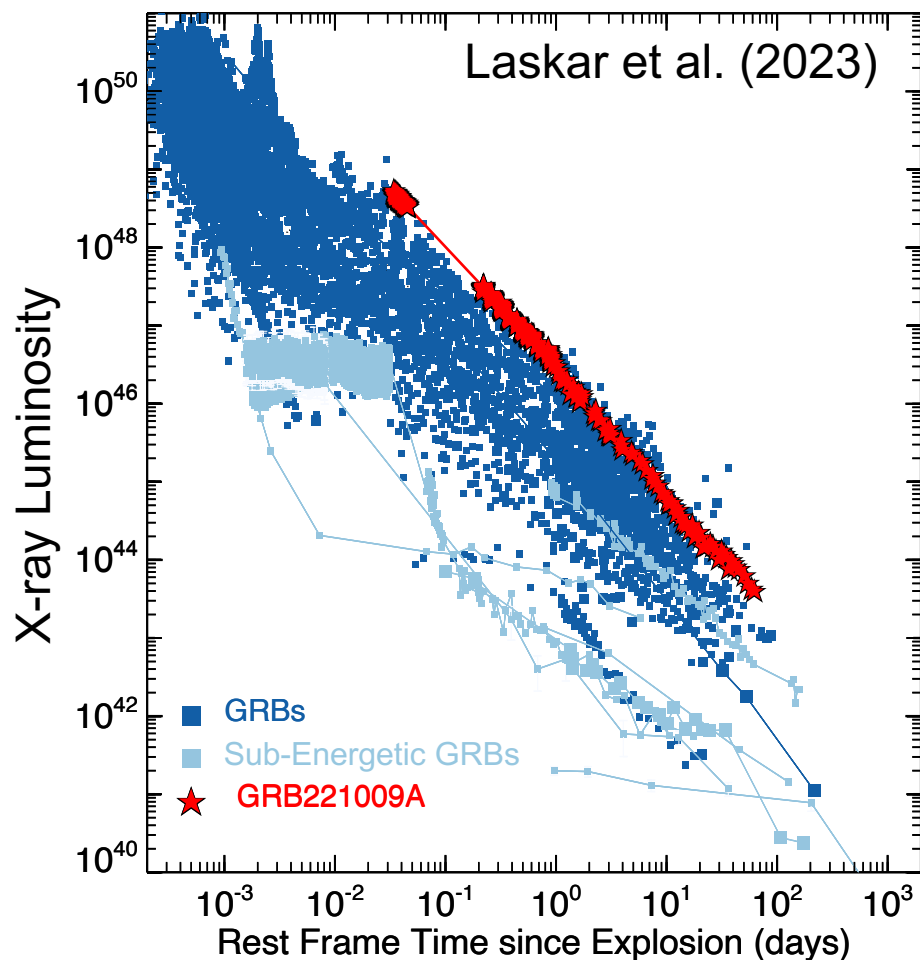
ATCA
CSIRO



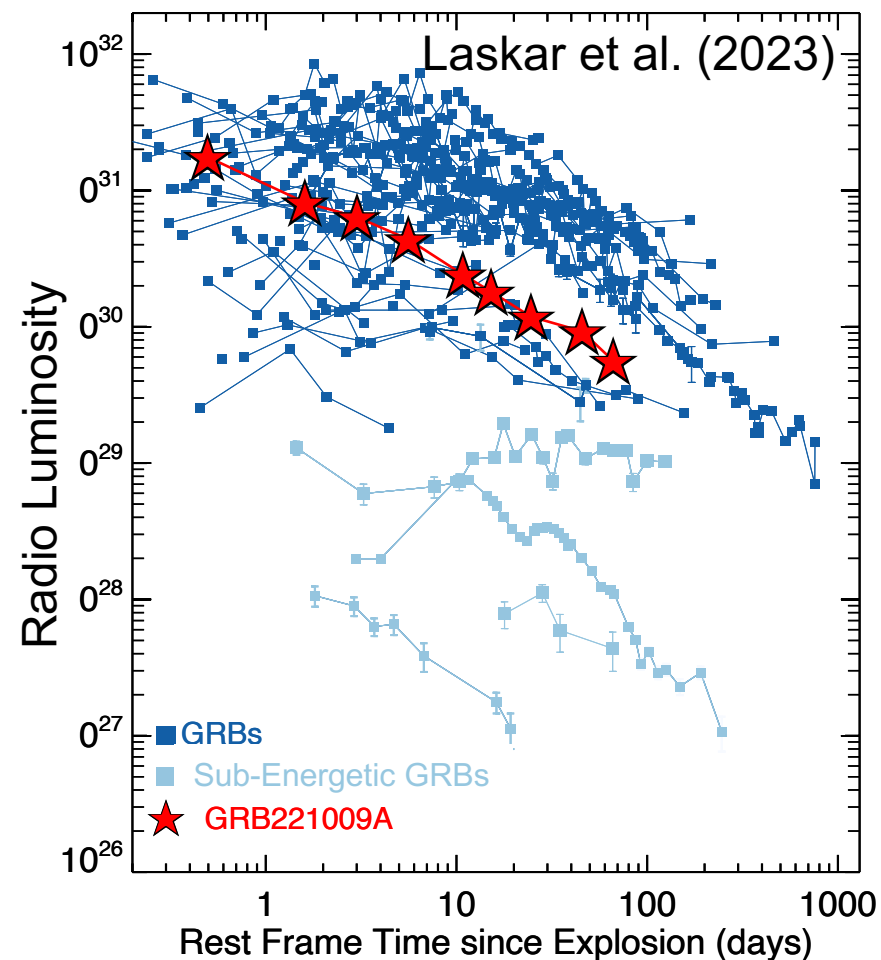
MeerKAT
SARAO

See Laskar et al. (2023), Kann et al. (2023), O'Connor et al (2023), Ren et al. (2022), Sato et al (2022), Bright et al. (2023), ...

GRB 221009A and other GRBs

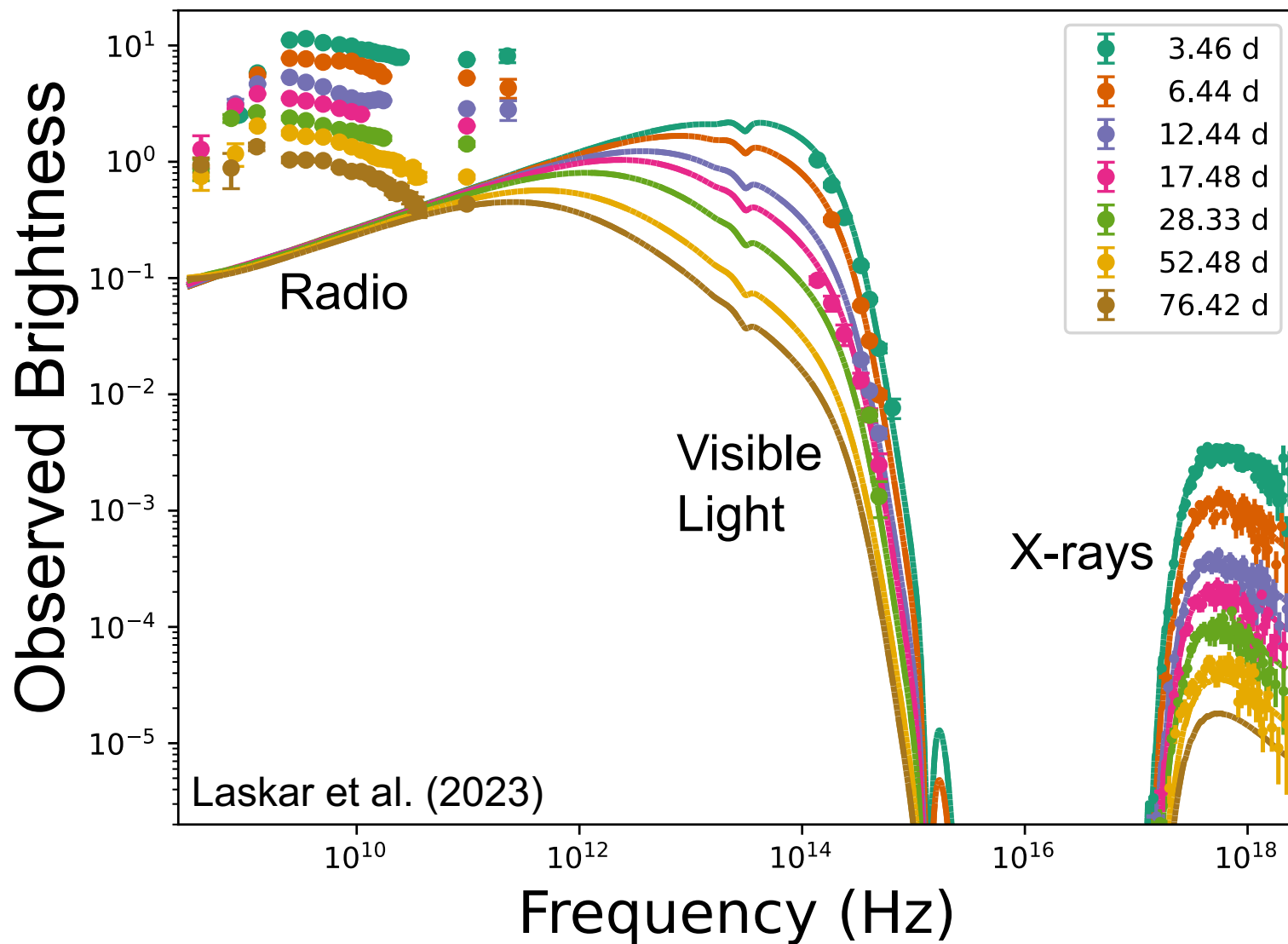


The brightest X-ray
afterglow ever!



But not very bright
in the radio...

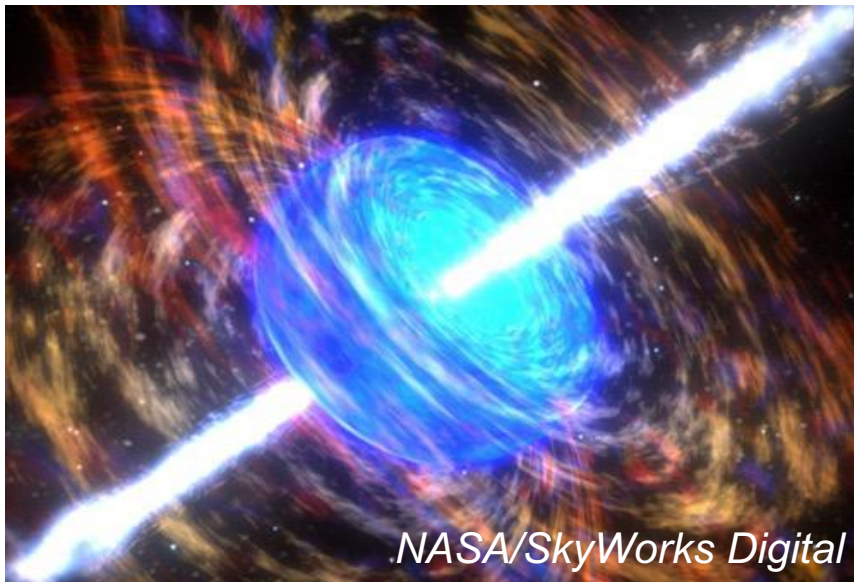
The BOAT breaks standard models



- GRB 221009A's jet is not unusually powerful.
- Instead, it is extraordinarily bright because it is nearby and exceptionally narrow.



- GRB 221009A's jet is not unusually powerful.
- Instead, it is extraordinarily bright because it is nearby and exceptionally narrow.
- We have a unique opportunity to test new physics and improve our understanding of the universe's most powerful explosions.



NASA/SkyWorks Digital

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