gamma-ray burst, named GRB 970508, occurred on 8 May 1997 and was detected by the *BeppoSAX* satellite, which provided a fairly accurate celestial position. I used a 0.9 m telescope at Kitt Peak National Observatory to image the location on two successive nights, resulting in the detection of a faint optically variable source within the error box.

Following my announcement, which gave accurate coordinates of the object,[2] Charles Steidel of Caltech was able to obtain its spectrum at the W. M. Keck Observatory.[3] He reported that the afterglow has a redshift z of 0.835 and settled once and for all that GRBs indeed lie at cosmological distances.

As Cummings and Lanzerotti's article recounts, Bohdan Paczyński had been the advocate for cosmological distance at the great debate. When I emailed him in the early morning to inform him of the results and to congratulate him on being right, he told me that he believed that he would allow himself a drink that evening.

References

1. Special issue, "The 75th anniversary astronomical debate on the distance scale to gamma-ray bursts," *Publ. Astron. Soc. Pac.* **107** (1995).
2. International Astronomical Union Circular No. 6654, 10 May 1997.
3. International Astronomical Union Circular No. 6655, 11 May 1997.

Howard E. Bond
(heb11@psu.edu)
Pennsylvania State University
University Park

When reading David Cummings and Louis Lanzerotti's article on "Early debates in space science" (Physics Today, February 2025, page 38), I was surprised to see their account of the solution to the mystery of where gamma-ray bursts come from.

Cummings and Lanzerotti mention the 1995 debate, held at the Smithsonian Institution's National Museum of Natural History, on whether gamma-ray bursts are galactic or extragalactic. They state that the debate "did not resolve the dispute" but rather a "combination of space- and ground-based observations two years later did." The authors mention Jan van Paradijs and his students, who in 1997 "were able to associate a gamma-ray burst with a specific galaxy" but unable to measure its emission-line spectra. They also mention a group led by Mark Metzger, who found a gamma-ray burst that occurred simultaneously with an optical flash, and resulting measurements "established beyond doubt that the burst sources were outside our galaxy."

The article does not mention that it was the Italian–Dutch satellite *BeppoSAX* that detected and promptly, and accurately, localized a gamma-ray burst that occurred on 28 February 1997. In addition, with the same satellite, it was possible to discover the first x-ray counterpart of a gamma-ray burst event.[1] The *BeppoSAX* team, of which I was one of the leaders, rapidly distributed the event coordinates in the International Astronomical Union circular. That made it possible for Jan van Paradijs and colleagues to discover an optical transient that had a position consistent with the gamma-ray burst x-ray counterpart.[2]

Also, the determination of the first gamma-ray-burst redshift by Metzger's group[3] was the result of the *BeppoSAX*'s detection and prompt, accurate localization of another event, GRB 970508. With the same satellite, it was also possible to discover its x-ray counterpart (that is, its x-ray afterglow).[4] And thanks to the prompt alert of our collaborators in Caltech, led by Shri Kulkarni, and those at the Very Large Array radio telescope, led by Dale Frail, it was possible to discover the optical and radio counterparts and to measure its redshift.[3,5]

For a more extended history of these discoveries, see my recently published review in reference 6.

References

1. E. Costa et al., *Nature* **387**, 783 (1997).
2. J. van Paradijs et al., *Nature* **386**, 686 (1997).
3. M. R. Metzger et al., *Nature* **387**, 878 (1997).
4. L. Piro et al., *Astron. Astrophys.* **331**, L41 (1998).
5. D. A. Frail et al., *Nature* **389**, 261 (1997).
6. F. Frontera, *Universe* **10**, 260 (2024).

Filippo Frontera
(filippo.frontera@unife.it)
University of Ferrara
Ferrara, Italy

► **Cummings and Lanzerotti reply:** We thank Bruce McKellar, Filippo Frontera, and Howard Bond for their comments in response to our article on early debates in space science that appeared in the February 2025 issue of Physics Today.

As McKellar states, there was certainly a great controversy exercised by Sydney Chapman over the existence of Kristian Birkeland's geomagnetic field–aligned currents. That important space science controversy was resolved by measurements taken by the *1963 38C* satellite[1] and analyzed by one of us (Cummings) with Alexander Dessler.[2] The controversy was not related to the debate, described in our feature, on whether the magnetosphere is open or closed. Alv Egeland and William Burke cover the life and career of Birkeland in more detail in their 2005 book, *Kristian Birkeland: The First Space Scientist*.

We particularly thank Frontera and Bond for adding personal details to the story about the determination of the distance scale of gamma-ray bursts. They cite our failure to mention the role of the *BeppoSax* satellite and its scientific team. Unfortunately, the word limit for our Physics Today article forced us to make difficult choices as to what to include. The contributions of *BeppoSax* and its team and the observation of GRB 970508 and its afterglow in its host galaxy are described in chapter 9 of our 2023 book, *Scientific Debates in Space Science: Discoveries in the Early Space Era*.

References

1. A. J. Zmuda, J. H. Martin, F. T. Heuring, *J. Geophys. Res.* **71**, 5033 (1966).
2. W. D. Cummings, A. J. Dessler, *J. Geophys. Res.* **72**, 1007 (1967).

W. David Cummings
(wcummings@usra.edu)
Universities Space Research Association
Washington, DC
Louis J. Lanzerotti
(louis.j.lanzerotti@njit.edu)
New Jersey Institute of Technology
Newark

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