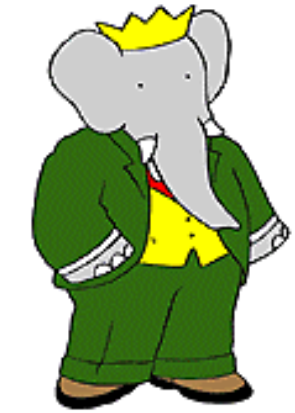


BaBar's First Steps

Tim Adye

Rutherford Appleton Laboratory

Particle Physics Department Meeting

19th January 2001

Where did all the anti-matter go?

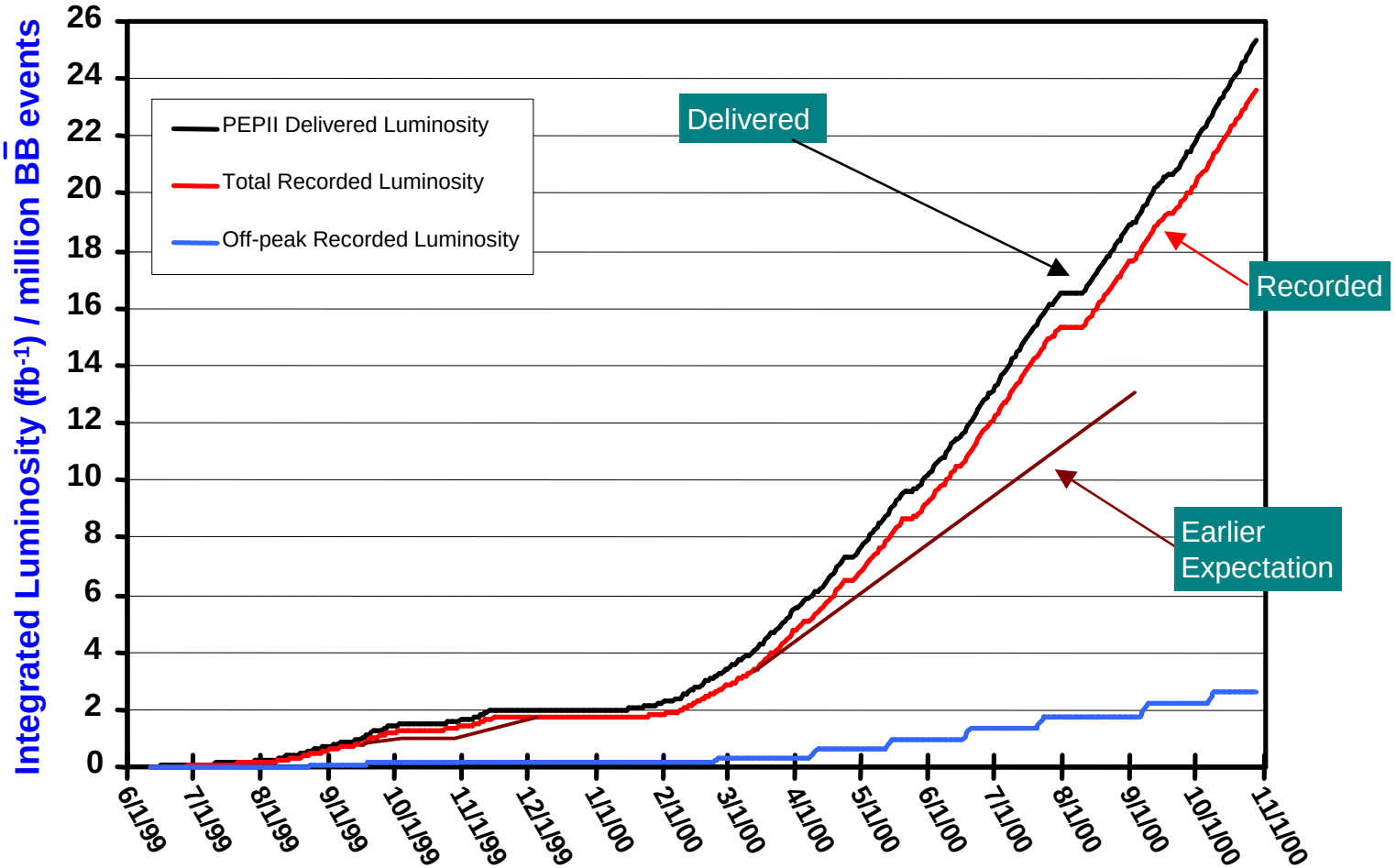
- Nature treats matter and anti-matter identically
- So far, just one exception seen
  - Certain rare decays of the K-meson differ slightly between K and anti-K.
    - Discovered in 1964
  - To understand it, we need another example
- Should also be able to see the effect in B-meson decays
  - If this "CP Violation" is large enough, it could help explain why the Universe is made of just matter.
    - Maybe the antimatter decayed
    - Otherwise, how to explain where all the antimatter went?

What are we looking for?

We are are looking for a **subtle effect** in a **rare** (and difficult to identify) decay, so need to record the results of a **large number** of events.

- Look for specific B-meson decays
- 1 in 100,000 B-decays

BaBar performance



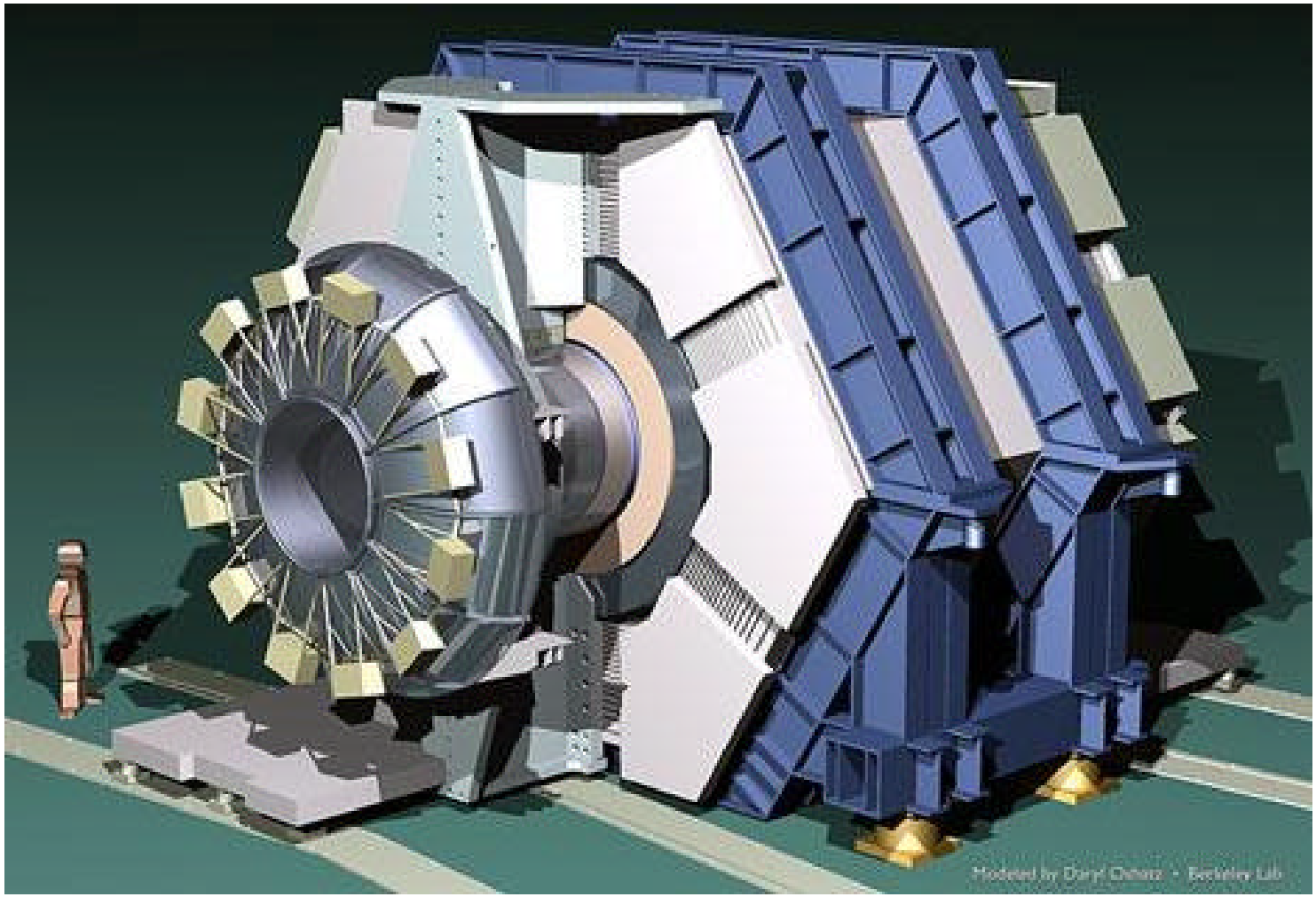
B Factories

	Date	*Years*	*# B events*
ARGUS	1982-92	10	0.5 million
DELPHI *	1990-95	6	0.9 million
CLEO II	1989-	11	10 million
Belle	1999-	1½	10 million
BaBar	1999-	1½	**22 million**

* LEP I; similarly for other LEP experiments

- In four (good) days, we are now recording more than ARGUS did in 10 years!
- BaBar and Belle have many more years to accumulate events (with increasing rate)

The BaBar Detector



The BaBar Collaboration

(quite a bit of it, anyway)

What we do in PPD

- We help ensure that BaBar can cope with all these events
  - Boda, Neil, and Stefy wrote/support a major component of the online system (Run Control)
    - Top-level control system for the detector operation
  - Tim manages the data exports throughout the collaboration in the US and Europe
  - Tim and Neil (with ITD) run UK Analysis centre
    - 4 TB of BaBar data on disk at RAL (6500 CD-ROMs, 2000 PC hard disks)
    - After SLAC, only RAL and Lyon have all the BaBar data
  - Neil produces simulated events on the ITD compute farm
    - Physics studies need more simulated data than real data
    - RAL contributes 10% (and growing) of the total

What we do in PPD

- And of course, we use all this data to do Physics (Gian, Stefy,…) ...

Conclusion

- BaBar's first couple of years have been highly productive.
  - Potential to be the worlds' best
  - First results presented at Osaka last July
  - First publication in a few weeks…

- PPD has made a major contribution, especially in the data acquisition and development of a distributed computing analysis model.