International Collaboration for **Data Preservation** and **Long Term Analysis** in High Energy Physics

Collaboration Across HEP and with Other Disciplines + An EIROForum Sub-Group

Joint WLCG – HSF Workshop
March 2018

Jamie.Shiers@cern.ch

Topics

- BaBar needs help (ICFA meeting)
- EIROForum WG on LTDP
- PV2018 / 2020

BaBar needs Help!

- *BABAR* data actively being analyzed and high impact papers published (see slide 2). Expect this to continue to at least through 2021.
- **SLAC management plans to stop hosting *BABAR* computing in February 2020 at which time the tapes with data will be ejected.**
- DOE support ended in 2017, now running on international common funds (OCF).
- Looking for possibility of support and long term data preservation at
  - **CERN,**
  - GridKa (*BABAR* site for analysis and XRootD federated dataset main redirector),
  - University of Victoria (*BABAR* site for analysis, documentation, and tools support).
- *BABAR* lightweight VMs come with the latest software release and xrootd client included, running under the most common virtual machine players. Just add the data via the GridKa main XRootD redirector.

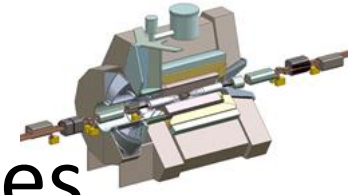
BaBar in Numbers

- **2PB of data on T10k-D tapes**
  - raw, processed, Monte Carlo
  - **Unique dataset at the Y(3S) resonance** (no plan at the moment to run at the Y(3S) @ Belle II)
- Full environment enclosed in **VMs** (SL5,SL6)
- ~1TB of documentation, repositories, and dataset information (DBs, cvs, wiki, html)
  - Internal documents archived on **INSPIRE**

- 574 papers, ~10 papers/year past 3 years
- 231 members (semi-frozen author list)
  - Including PhD students in Canada, Germany, Israel, Italy, Russia, US
  - Associated theorists mine data to test new ideas
- ~20 analyses on track, ~10 more in the pipeline
  - Continue to have new analyses every year including joint *BaBar* -Belle analyses
- **Students analyze *BaBar* data while working on Belle II and other experiments in construction/commissioning phase**

Data could be hosted in CERN robots & then migrated forward.

BaBar Highlights and Press Releases



BERKELEY LAB
Bringing Science Solutions to the World

About the Lab | Leadership/Organization | Calendar | News Cent

NEWS CENTER

New Study: Scientists Narrow Down the Search for Dark Photons Using Decade-Old Particle Collider Data

Analysis of data from the BaBar experiment rules out theorized particle's explanation for muon mystery

News Release Glenn Roberts Jr. (510) 5

November 2017

The BaBar detector at SLAC National Accelerator Laboratory. (Credit: SLAC)

INTERACTIONS.ORG
PARTICLE PHYSICS NEWS AND RESOURCES

Home | About | Particle People

A communication resource from the world's particle physics laboratorie

New study: Scientists narrow down the sea photons using decade-old particle collider d

8 November 2017 - Lawrence Berkeley National Laboratory

Analysis of data from the BaBar experiment rules out theorized particle's explanation for muon mystery

In its final years of operation, a particle collider in Northern California was refocused to search for signs of new particles that might help fill in some big blanks in our understanding of the universe.

A fresh analysis of this data, co-led by physicists at the Department of Energy's Lawrence Berkeley National Laboratory (Berkeley Lab), limits some of the hiding places for one type of theorized particle – the dark photon, also known as the heavy photon – that was proposed to help explain the mystery of dark matter.

The latest result, published in the journal *Physical Review Letters* by the roughly 240-member BaBar Collaboration, adds to results from a collection of previous experiments seeking, but not yet finding, the theorized dark photons.

"Although it does not rule out the existence of dark photo hide, and definitively rule out their explanation for anothe property of the subatomic particle known as the muon," University of Victoria professor.

Dark matter, which accounts for an estimated 85 percent been observed by its gravitational interactions with norm galaxies is much faster than expected based on their visi

DATE ISS
November 8
SOURCE
Lawrence B
CONTEN
Press Release
CONTACT:

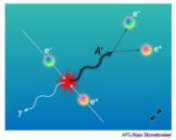
Physics | ABOUT | BROWSE | PRESS | COLLECTIONS

Viewpoint: New Light Shed on Dark Photons

Douglas Bryman, University of British Columbia, Vancouver, British Columbia V6T2A3, Canada

November 10, 2014 • Physics 7, 115

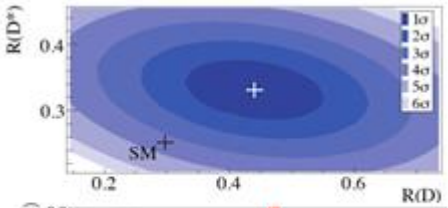
A search for a photonlike particle that could be related to dark matter has come up empty, putting new constraints on models that imagine a dark form of electromagnetism.

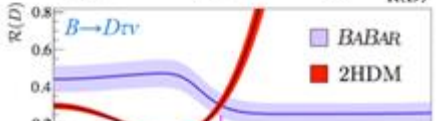


PDF Version | Print

Search for a Dark Photon in e^+e^- Collisions at *BaBar*
J. P. Lees *et al.* (BaBar Collaboration)
Phys. Rev. Lett. 113, 201801 (2014)
Published November 10, 2014
Read PDF

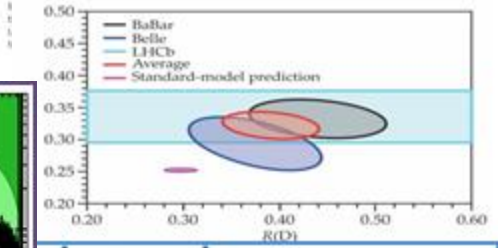
Features
Q&A: A Condensed Matter Theorist Embraces AI
Juan Carrasquilla gave himself a crash course on machine learning and found a new way of approaching condensed-matter theory.
Meetings: Interplanetary GPS





The Economist

The arrow of time
Backward ran sentences...
To the relief of physicists, time really does have a preferred direction



nature
International journal of science

Altmetric: 512 | Citations: 2 | More deta

Review

A challenge to lepton universality in B-meson decays

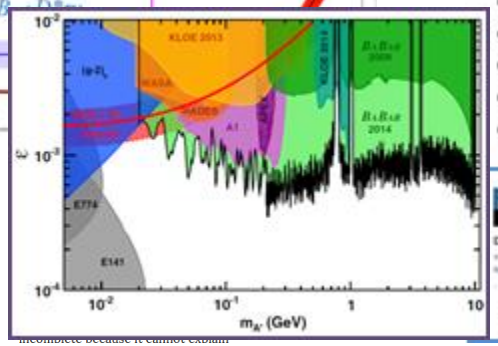
Gregory Ciezarek[1], Manuel Franco Sevilla[2], Brian Hamilton[3], Robert Kowalewski[4], Thomas Kuhr
Vera Lüth & Yutaro Sato[7]

Nature 546, 227–233 (08 June 2017) | Received: 15 December 2016
doi:10.1038/nature2 | arch 2017
Download Citation | e: 07 June 2017

June 2017

Experimental particle physics | Phenomenology | Theoretical particle physics

Abstract



physicstoday

Democracy suffers a blow—in particle physics

Dataset:
Y(4S): 433/fb
Y(3S): 30/fb
Y(2S): 14/fb
Off resonance: 10%
Y(1S) accessed via
Y(2S,3S) → Y(1S) $\pi^+\pi^-$

EIROForum Working Group on LTDP

EIROForum consists of the institutes below.

- DGs meet regularly (chair rotates)
- IT TWG exists (chair rotates according to DG)

CERN	European Organisation for Nuclear Research
EMBL	European Molecular Biology Laboratory
ESA	**European Space Agency**
ESO	European Organisation for Astronomical Research in the Southern Hemisphere
ESRF	European Synchrotron Radiation Facility
European XFEL	European XFEL Free-Electron Laser Facility
EUROfusion	European Consortium for the Development of Fusion Energy
ILL	Institut Laue-Langevin

EIROforum

EIROForum sub-group on LTDP

- As described above, “space agencies” developed and maintain OAIS and related standards
  - Procedure for getting input – which is welcomed – to updates (iPRES 2016)
- ESRIN (Frascati) also behind “PV” conference series
  - Typically rotates around European “Space Centres”

- Visit from ESRIN LTDP experts to CERN in February: proposal to continue information exchange via **regular (6 monthly?) technical meetings**

- Propose to next EIROForum ITWG meeting and at PV 2018

- Possibly extend to other institutes, e.g. those involved in ESFRI and similar projects? Let’s see how it starts first…

EIROforum

PV2018 Conference

- PV 2018 will be held at UK Space Centre (RAL campus) 15 – 17 May 2018
- **Next PV (2020) will be at CERN!**
- Desire to extend to more (scientific) disciplines
- Although it is a conference, not a working meeting, could use it to build on the more frequent EIROForum meetings

2020 Vision for LT DP in HEP

- **<u>Long-term</u>**: disruptive change(s)
  - All archived data – e.g. that described in Blueprint, including LHC data – easily findable, fully usable by designated communities with clear (Open) access policies and possibilities to annotate further
  - Best practices, tools and services well run-in, fully documented and sustainable; built in common with other disciplines, based on standards
- Vision achievable, but we are far from this today

From ICFA meeting, February 2013 (Vancouver)

Summary

- Space agency(-ies) defined OAIS
- Now coming to HEP to share (our) experiences
- Opportunities to expand this to other large European organisations, ESFRIs and possibly wider in the world
- *Didn't we do well?*