

Giving researchers what they want

SPIRES, High-energy physics and
subject repositories

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INSPIRE Collaboration

OAI6
June 18 2009

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Overview

- History of Subject Repositories in High Energy Physics
 - User driven
- Current status and observations
 - User driven
- Future Plans
 - User driven

Infrastructure

The basic facilities, **services** and installations **needed** for the functioning of a **community** or society *wiktionary.org*

Community: HEP

- Questions like:
 - What is the universe made of
 - How does that stuff (us) get along with everything else
- HEP Researchers
 - About 20-30,000 worldwide
 - Distinction between Theory and Experiment

Users

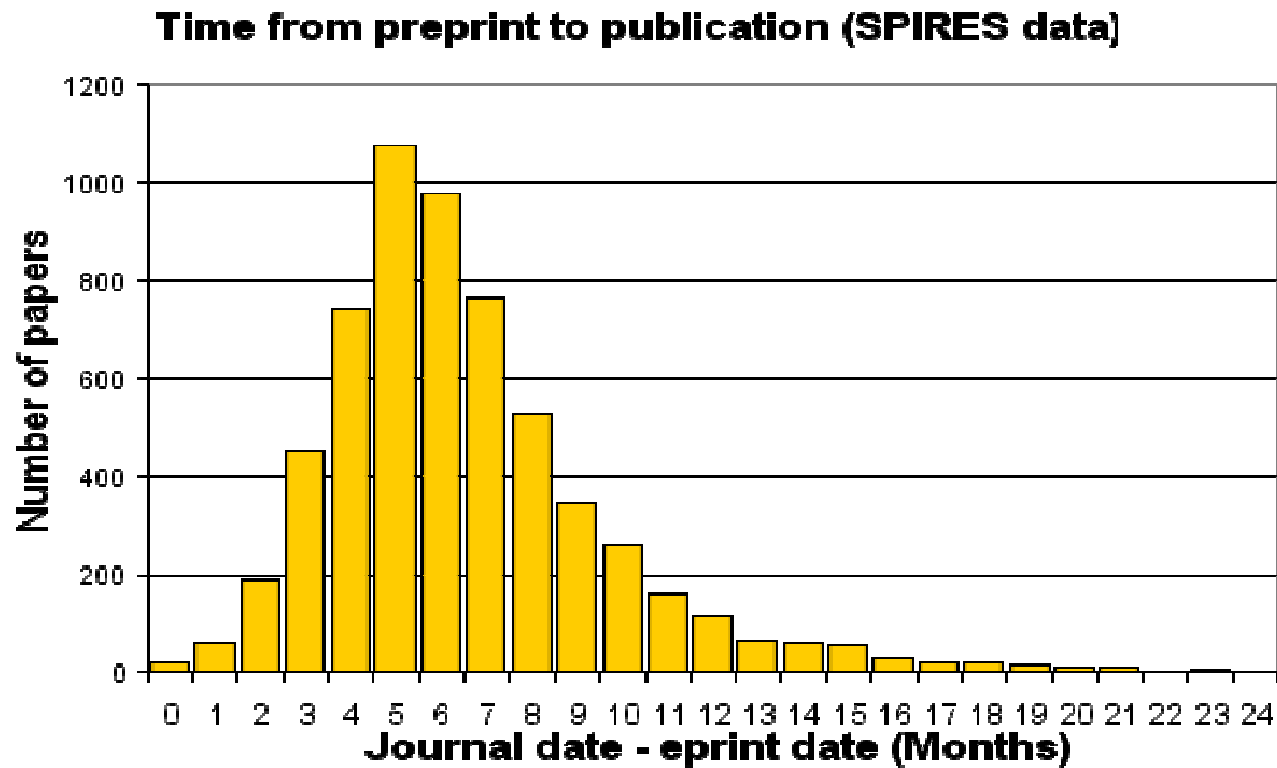
- Theory
 - 50% of the people
 - 80% of the papers
 - Small, global collaborations (<10 authors)
 - Self-Contained papers
- Experiment
 - 50% of the people
 - 20% of the papers
 - Large, global collaborations
 - >2000 authors on CERN LHC papers
 - Big centers of research
 - SLAC, Fermilab, CERN, DESY, KEK

Community: HEP

- Connections
 - Labs connected to experiments
 - People connected in collaborations
 - Institutes connected to their papers
- Information Needs
 - Results as **fast** as possible
 - New ideas shared **rapidly**
 - Conversational
 - **Simplicity** of discovery

Read Journals?

- Several places to look
- Too Slow – Researchers read (and cite) preprints in the first few months



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Preprint Culture

- Connections
 - + desire for speed
 - > Preprint culture
 - driven at the researcher level
- Rapid Communication
- Self-contained papers
- Self-contained community of experts

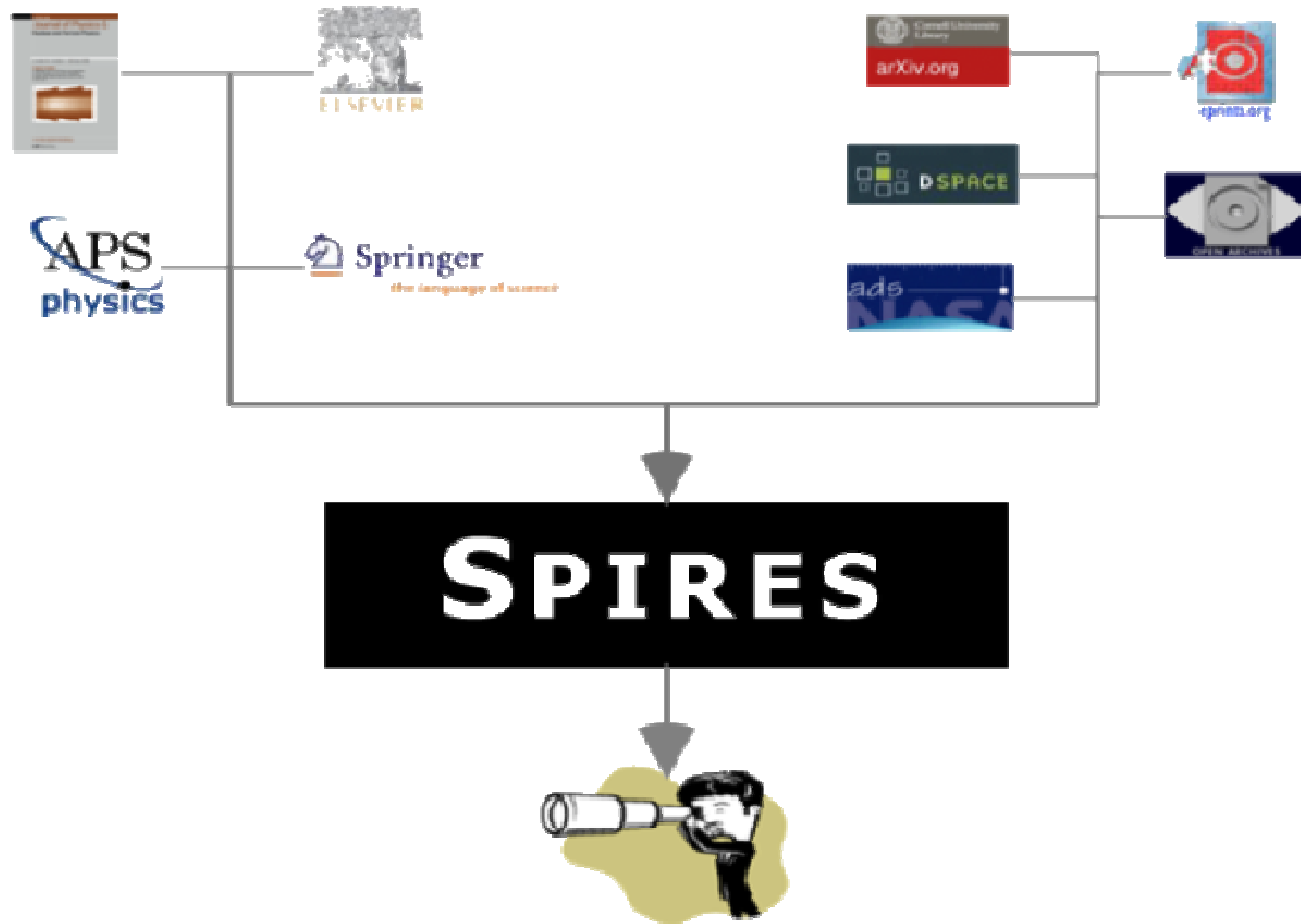
Search Institutional Repositories?

- Not favored by HEP researchers
- Too many places to look
 - Search is complex
- Many papers not in any IR
 - Leaks, Institutions without IR, older papers, etc.

Where do users look?



SPIRES



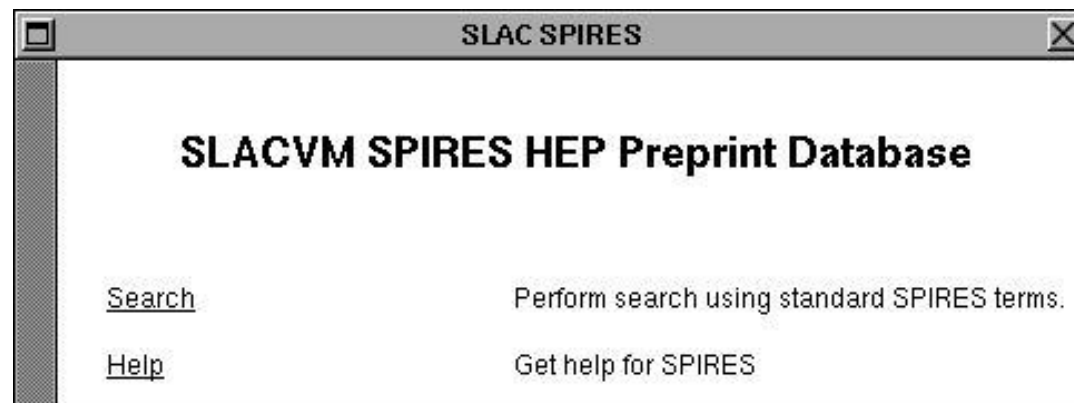
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SPIRES' History

- First HEP Institutional Repositories store *paper* papers
- Distributed via postal mail to major centers
- SPIRES catalogs (and distributes) preprints received at SLAC
- Centralized, community-driven model
 - Major lab libraries... essentially the world HEP preprint catalog.
- Preprint list
 - SPIRES distributes preprint list "what's new" on weekly basis (much faster than publication)
 - Published papers get put on "anti-preprint" list (preprints that became published)
 - Really Simple Syndication!

SPIRES' History

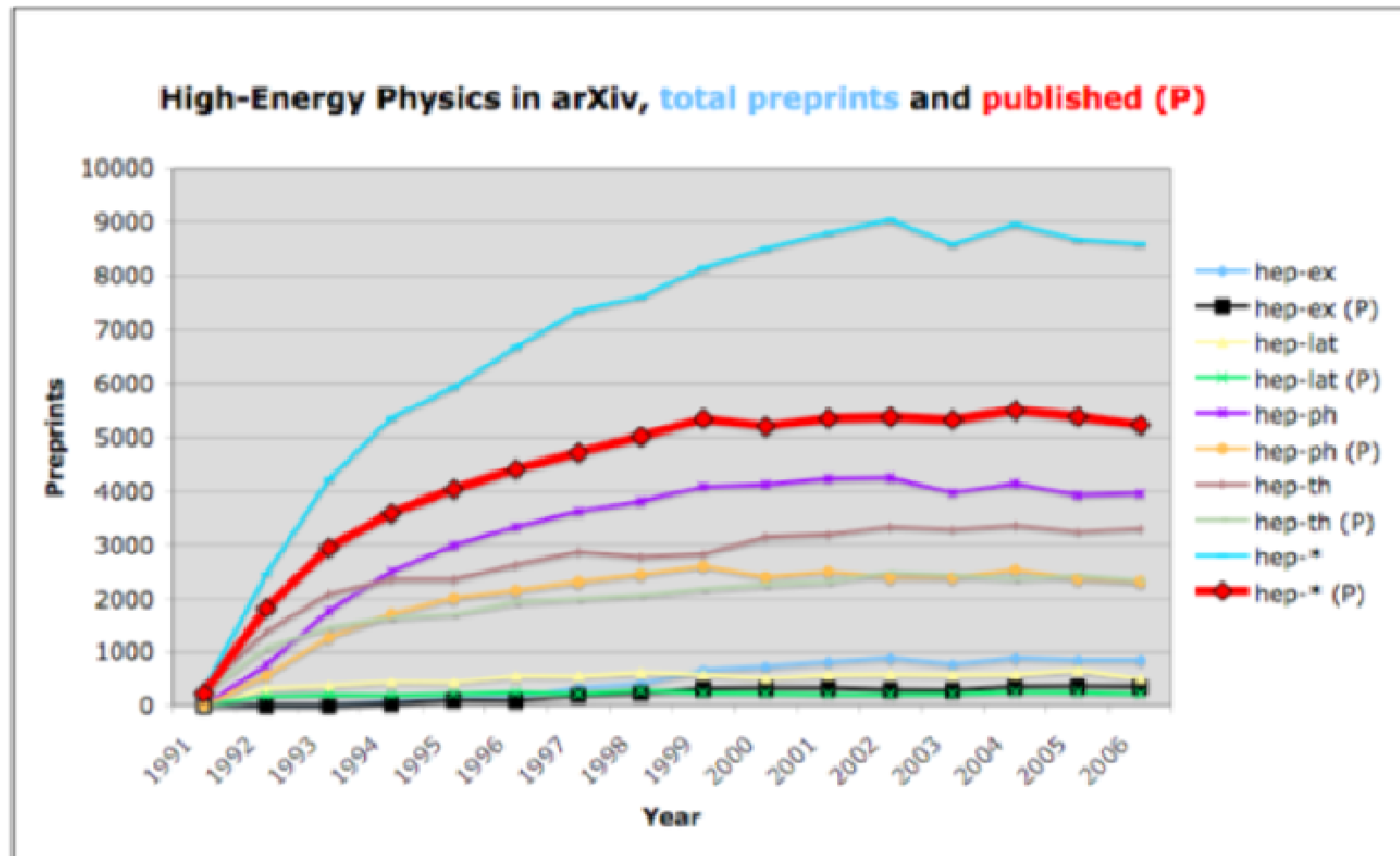
- Collaboration of DESY, Fermilab and SLAC
- Community driven and defined
- Currently 1-1.5 Million queries/month
- Index to HEP literature for 35 years
 - Via terminal login
 - Via email
 - Via web (1st U.S. Website/1st web database)



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arXiv.org

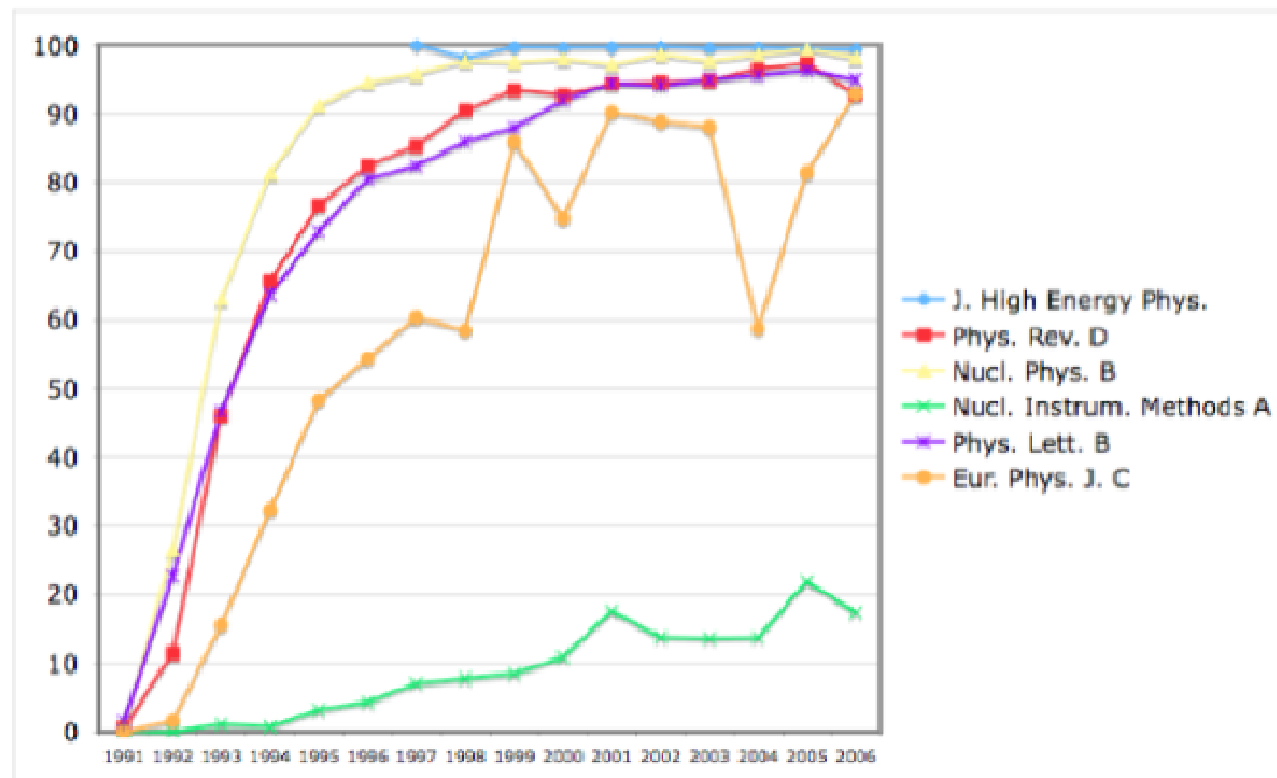
- Since 1991 - “Extension” of SPIRES to Fulltext
- Electronic Preprint dissemination



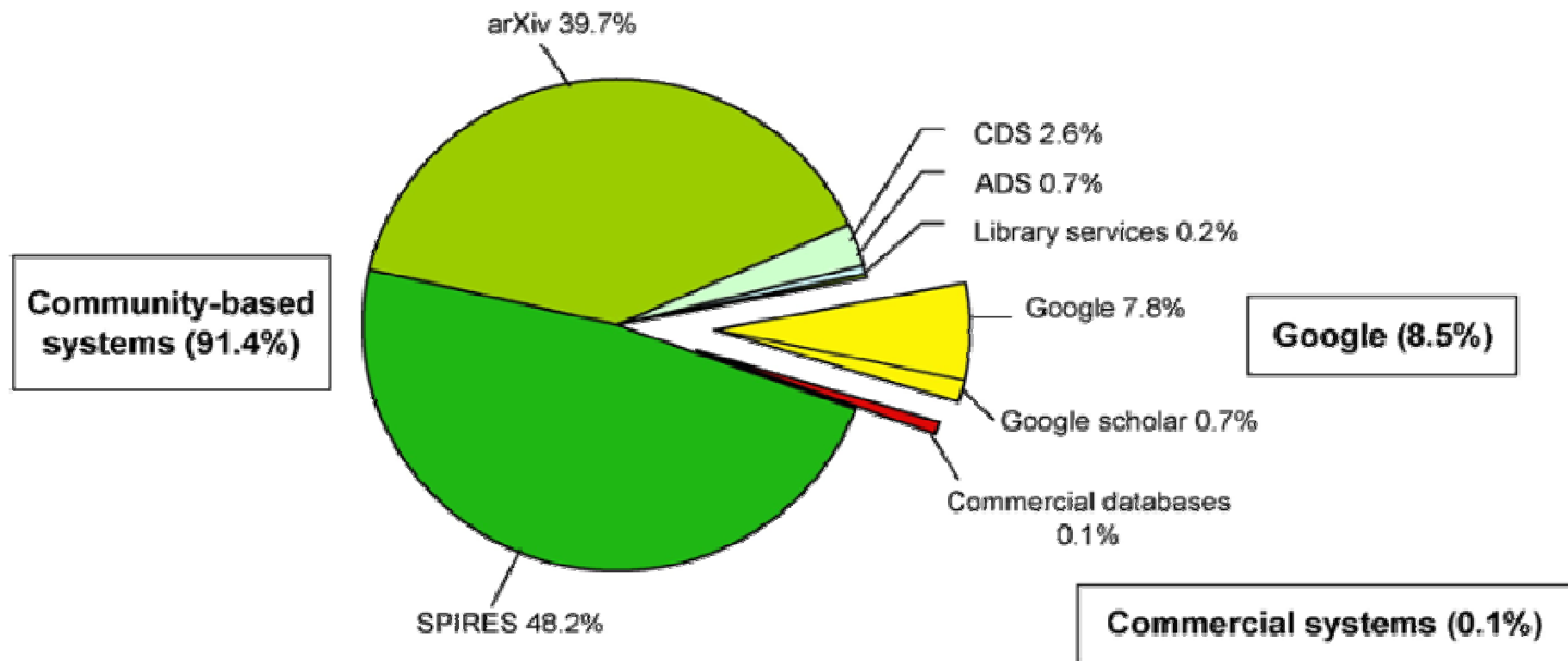
User Satisfaction

- No mandate, no debate, no advocacy:
 - 100% Author driven
- Author-formatted peer-reviewed revisions uploaded
- (Almost) all publishers allow self-archiving.

Fraction of articles
posted to arXiv



Where Do Physicists Search?



From 2007 survey of 2,000 physicists by CERN, DESY, Fermilab and SLAC.
Gentil-Beccot et al, *Information Resources in High-Energy Physics: Surveying the Present Landscape and Charting the Future Course*. J.Am.Soc.Inf.Sci.60:150-160,2009 arXiv:0804.2701

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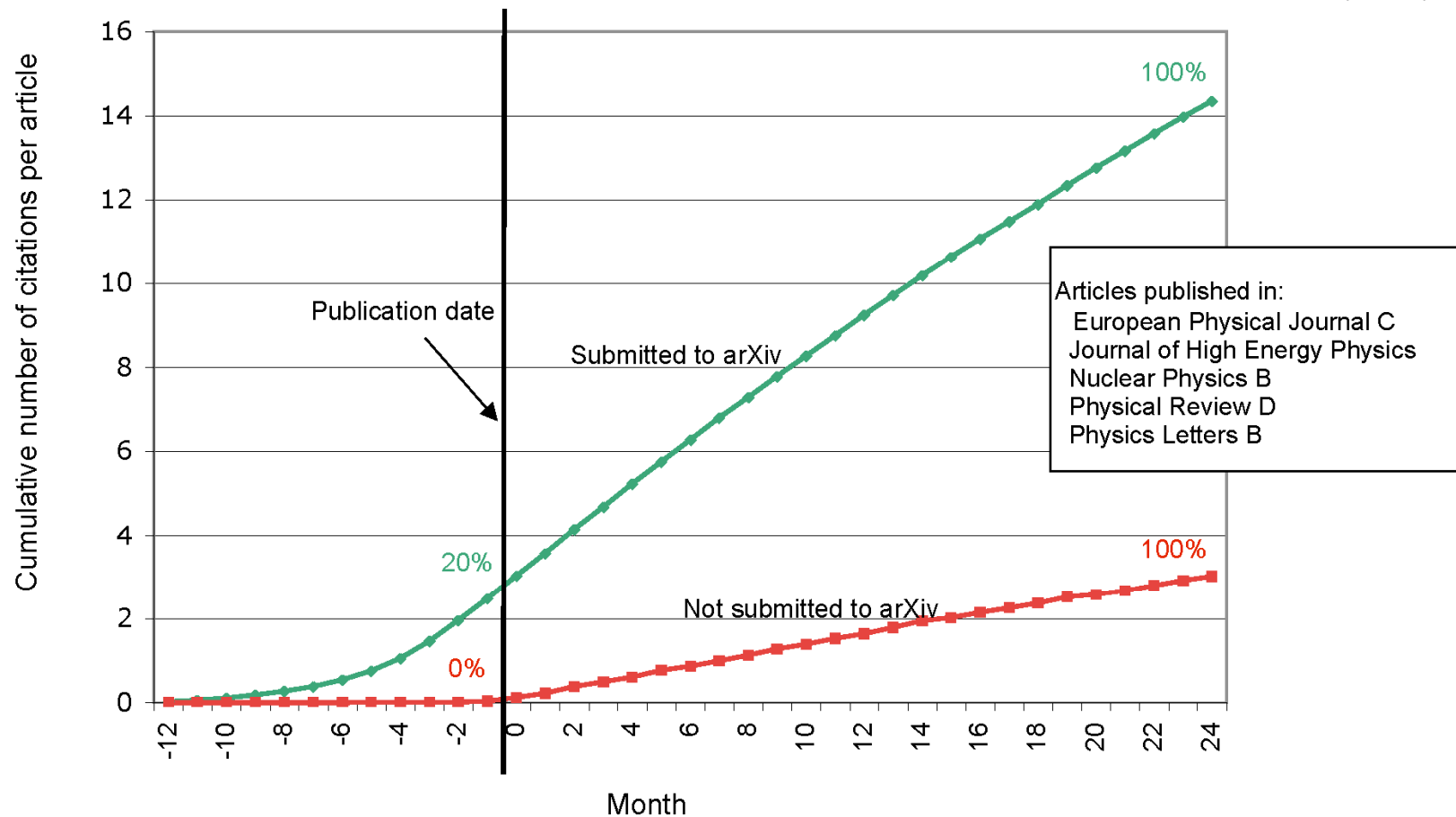
Benefits to Researchers

- arXiv+SPIRES
 - Centralized discipline-based repository with curated metadata/search
 - Discovery is easy (1-stop)
 - Includes Peer reviewed literature
 - matching/joining if preprinted
 - Access is easy
 - dois, urls, arXiv
 - Links to every known copy
 - Speed is instant for preprints, peer review follows after the necessary delay
 - The best features of Journals and Repositories, combined

Researchers like speed

- Articles as a mode of discussion
- Rapidly advancing field

arxiv:0906.5418
Gentil-Beccot, Mele, Brooks



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Benefits to Repositories

- SPIRES + arXiv
 - Authors motivated to submit...since they search there
 - SPIRES/arXiv is where the HEP conversation takes place
 - If you don't submit, you don't get read
 - Affiliation search
 - IR can fill themselves from affiliation searches

Benefits to Publishers

- Can reach all of HEP in one place
 - SPIRES/arXiv directs eyeballs to the published versions
 - Integrated services
 - Cross-linking
 - Submit papers from arXiv to journal
 - Metadata feeds..in both directions

Why SPIRES + arXiv?

- Grew from a **community**
 - Global collaborations
 - Connections with large research centers
 - Researchers, Repositories, Publishers all involved
- **Evolved from user needs:**
 - Simplicity of discovery
 - Speed of communication
 - Published literature

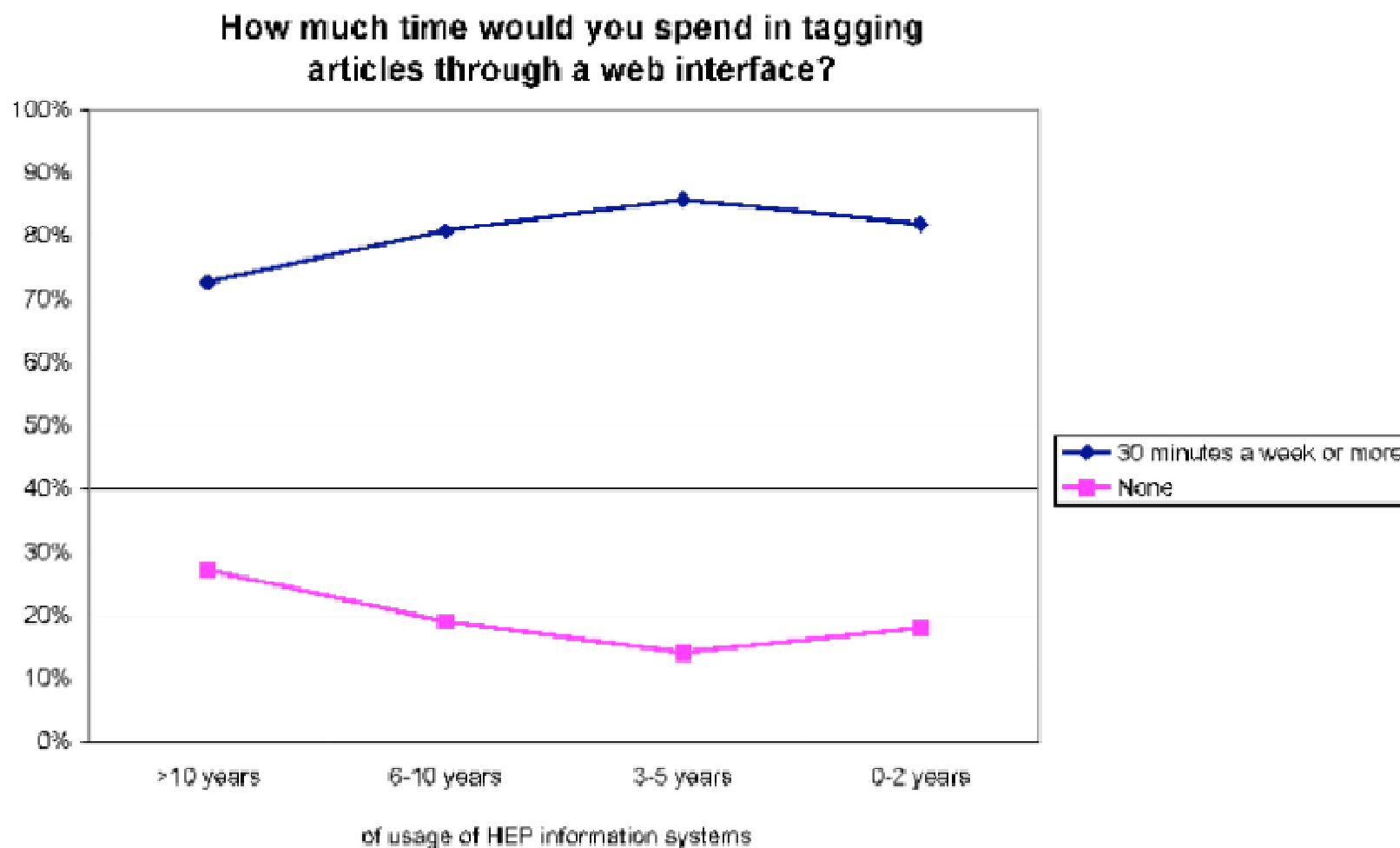
Future of HEP Information

- Continue to **evolve**
- Conversations on arXiv
 - Noting, but not waiting for peer review.
- **blog/wiki - like**
 - Most of the everyday information research tasks in HEP are carried out on one of two sites
 - Freely accessible content
 - Community driven
- Use technology to tighten this relationship further...with an existing community

Future of HEP Information

- HEP becoming more interdisciplinary
 - Particle astrophysics
- Literature growing more complex
 - Computer code
 - Objects that aren't papers, but are "information"
 - "Datasets", figures, tables
- Advances in information systems
 - Modern coding and design
 - Mashups
 - Web 2.0

Hidden 20 FTE



From 2007 survey of 2,000 physicists by CERN, DESY, Fermilab and SLAC
Gentil-Beccot et al, *Information Resources in High-Energy Physics: Surveying the Present Landscape and Charting the Future Course*. J.Am.Soc.Inf.Sci.60:150-160,2009 arXiv:0804.2701

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SPIRES' Future?

- SPIRES should grow with the field and with technology
- SPIRES' 35 year old infrastructure cannot take advantage of new tools
 - Needs a solid foundation on which to build
 - 3-4 Years ago SPIRES began looking for migration possibilities

INSPIRE

- Joint Project of CERN, DESY, Fermilab and SLAC
- Migrate SPIRES to CERN's Invenio platform
- Rollout: End 2009
- SPIRES Community Organization transitions to INSPIRE
 - Bring down rigidly defined walls
 - Move to 21st century

Invenio: Modern System...

- Stable, modern, extensible software stack (LAMP)
- Fast, even with large (discipline) repository
- Focused on search
- Open Source (GPL) community
 - Substantial HEP use (CERN, ILC, ...)
 - Over 20 *production* instances worldwide
- Modular architecture
- Based on open standards
 - MARCXML, OAI-PMH, etc
- Flexible in every layer

Complementing SPIRES' Strengths

- Decades of trusted, curated content
- Experience managing a discipline wide information resource
- Close relationship with worldwide user community
- Operational resources at major labs
 - Will move forward to INSPIRE

Opportunities

- Understanding Authors
 - Claim your papers
 - Which J. Ellis? (Already have affiliation data)
 - Assist in referee selection
 - Standardizing formats for author list
- Data Objects
 - Index locations of large data stores
 - Connect them to papers
 - Hosting figures, tables, plots and other smaller data objects

Opportunities

- Keywording/Tagging
 - Automated extraction using taxonomy
 - User tagging
 - You tell your group
 - You tell PDG
- Closer work with other fields
- Improved Jobs system for HEP



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☐ 1. **Cosmological Constant and Axions in String Theory.**

[Peter Svrcek](#) ([Stanford U.](#), [Phys. Dept.](#) & [SLAC](#)), [SLAC-PUB-11957](#), Jul 13, 2006, 22 pp.

Published in [JHEP](#)

e-Print: [hep-th/0607086](#)

[References](#) | [BibTeX](#) | [LaTeX\(US\)](#) | [LaTeX\(EU\)](#) | [EndNote](#)

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☐ 2. **Axions in String Theory.**

[Peter Svrcek](#) ([Stanford U.](#), [Phys. Dept.](#) & [SLAC](#)), [Edward Witten](#) ([Princeton](#), [Inst. Advanced Study](#)), [SLAC-PUB-11894](#), May 22, 2006, 62 pp.

Published in [JHEP 0606: 051, 2006](#)

e-Print: [hep-th/0605206](#)

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Axions In String Theory.

Peter Svrcek (Stanford U., Phys. Dept. & SLAC), Edward Witten (Princeton, Inst. Advanced Study).
May 22, 2006

Published in: JHEP 0606: 051, 2006
e-Print: [hep-th/0605206](#)

Abstract: In the context of string theory, axions appear to provide the most plausible solution of the strong CP problem. However, as has been known for a long time, in many string-based models, the axion coupling parameter F_a is several orders of magnitude higher than the standard cosmological bounds. We re-examine this problem in a variety of models, showing that F_a is close to the GUT scale or above in many models that have GUT-like phenomenology, as well as some that do not. On the other hand, in some models with Standard Model gauge fields supported on vanishing cycles, it is possible for F_a to be well below the GUT scale.

Keyword(s): [string model](#); [heterotic](#); [gauge field theory](#); [SU\(3\)](#); [instanton](#); [axion](#); [violation](#); [CP](#); [dimensional reduction](#); [anomaly](#); [membrane model](#); [D-brane](#); [bibliography](#)

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Svrcek, Peter

Affiliations:	Papers:
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Stanford U., Phys. Dept. (3)	Lectures (1)
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	Thesis (1)
Frequent keywords:	Citations:
anomaly (5)	
analytic properties (5)	
twistor (4)	
scattering amplitude, higher-order (4)	
string model (3)	
gauge field theory, Yang-Mills (3)	
compactification (3)	
bibliography (3)	
instanton (2)	
gauge field theory, U(N) (2)	
Frequent co-authors:	
Cachazo, Freddy (5)	
Witten, Edward (4)	
Kachru, Shamit (2)	
Diaconescu, Duiliu-Emanuel (1)	
Florea, Bogdan (1)	
McGreewy, John (1)	

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Famous papers (250-499)	0	0
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Well-known papers (50-99)	2	1
Known papers (10-49)	4	3
Less known papers (1-9)	3	2
Unknown papers (0)	1	0

See also: similar author names

1 [Svrcek, P.](#)

Axions in String Theory - [Svrcek, Peter](#) et al hep-th/0605206 SLAC-PUB-11894

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- (115) [Four-dimensional String Compactifications with D-Branes, Orientifolds and Fluxes](#) - [Blumenhagen, Ralph](#) et al hep-th/0610327 CERN-PH-TH-2006-218
- (51) [On inflation in string theory](#) - [Kallosh, Renata](#) hep-th/0702059 [HEP-TH]
- (32) [String Cosmology: A Review](#) - [McAllister, Liam](#) et al arXiv:0710.2951 [hep-th] SLAC-PUB-12782, SITP-07-17
- (20) [Axions: Motivation, limits and searches](#) - [Raffelt, Georg G.](#) hep-ph/0611118 MPP-2006-146
- (16) [S-track stabilization of heterotic de Sitter vacua](#) - [Curio, Gottfried](#) et al hep-th/0606243 LMU-ASC-41-06, HUTP-06-A0020

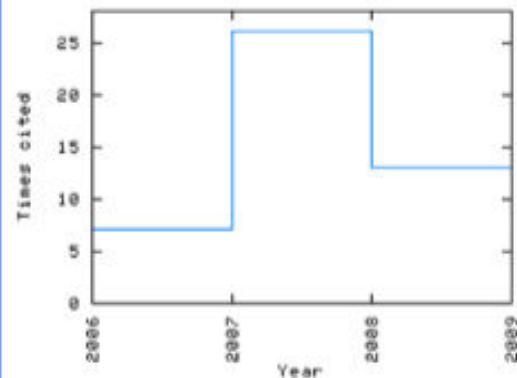
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- (25) [The QCD axion and moduli stabilisation](#) - [Conlon, Joseph P.](#) hep-th/0602233 DAMTP-2006-17
- (24) [De Sitter vacua in string theory](#) - [Kachru, Shamit](#) et al hep-th/0301240 SLAC-PUB-9630, SU-ITP-03-01, TIFR-TH-03-03
- (24) [Hierarchies from fluxes in string compactifications](#) - [Giddings, Steven B.](#) et al hep-th/0105097 SLAC-PUB-8807, NSF-ITP-01-37, SU-ITP-01-16
- (22) [First results from the CERN Axion Solar Telescope \(CAST\)](#) - [Zioutas, K.](#) et al hep-ex/0411033
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[The Ultraviolet Behavior of N=8 Supergravity at Four Loops](#) - [Bern, Z. et al](#) - SLAC-PUB-13608UCLA-09-TEP-09-47arXiv:0905.2326

Additional file(s):

-  **GuideToNeq8Files**
 - version 1 [GuideToNeq8Files.nb](#) [198829 B]
 - [GuideToNeq8Files.pdf](#) [311242 B]
-  **Neq8FourLoops**
 - version 1 [Neq8FourLoops.m](#) [2817045 B]
-  **SUGRA1**
 - [SUGRA1.nb](#) [35697 B]
 - version 1 [SUGRA1.pdf](#) [22182 B]

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- 2. **Measurements of the cross-section for $e^+e^- \rightarrow$ hadrons at center-of-mass energies from 2-GeV to 5-GeV.**

J.Z. Bai, *et al.*, SLAC-PUB-8938, Feb 6, 2001, 5 pp.

Published in **Phys.Rev.Lett. 88: 101802, 2002**

e-Print: **hep-ex/0102003**

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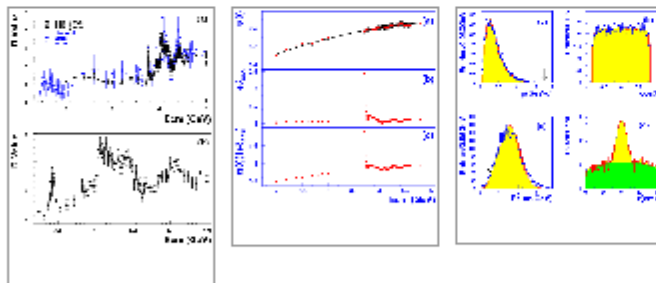
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- 3. **Measurement of the total cross-section for hadronic production by e^+e^- annihilation at energies between 2.6-GeV - 5-GeV.**

J.Z. Bai, *et al.*, SLAC-REPRINT-1999-087, Aug 12, 1999, 5 pp.

Published in **Phys.Rev.Lett. 84: 594-597, 2000**

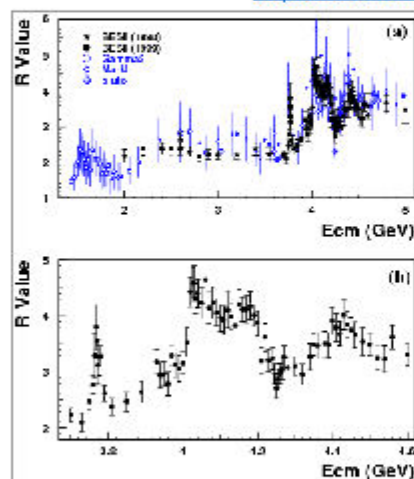
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Abstract: We report values of

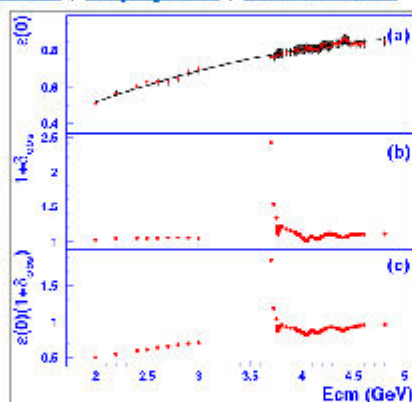
$$R = \sigma(e^+e^- \rightarrow \text{hadrons}) / \sigma(e^+e^- \rightarrow \mu^+\mu^-)$$

for 85 center-of-mass energies between 2 and 5 GeV measured with the upgraded Beijing Spectrometer at the Beijing Electron-Positron Collider.

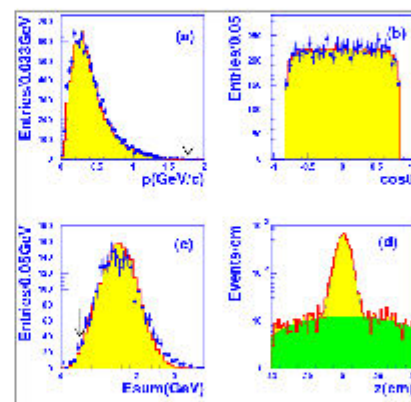
Keyword(s): [electron positron: colliding beams](#) ; [electron positron: annihilation](#) ; [hadron: multiple production](#) ; [cross section: hadronic](#) ; [energy dependence](#) ; [magnetic spectrometer: BES](#) ; [experimental results](#) ; [Beijing Stor](#) ; [2-5 GeV-cms](#)



(a) A compilation of measurements of R in the c.m. energy range from 1.4 to 5 GeV. (b) R values from this experiment in the resonance region between 3.7 and 4.6 GeV.



(a) The c.m. energy dependence of the detection efficiency for hadronic events estimated using the LUARLW generator. The error bars are the total systematic errors. (b) The calculated radiative correction, and (c) the product of (a) and (b).



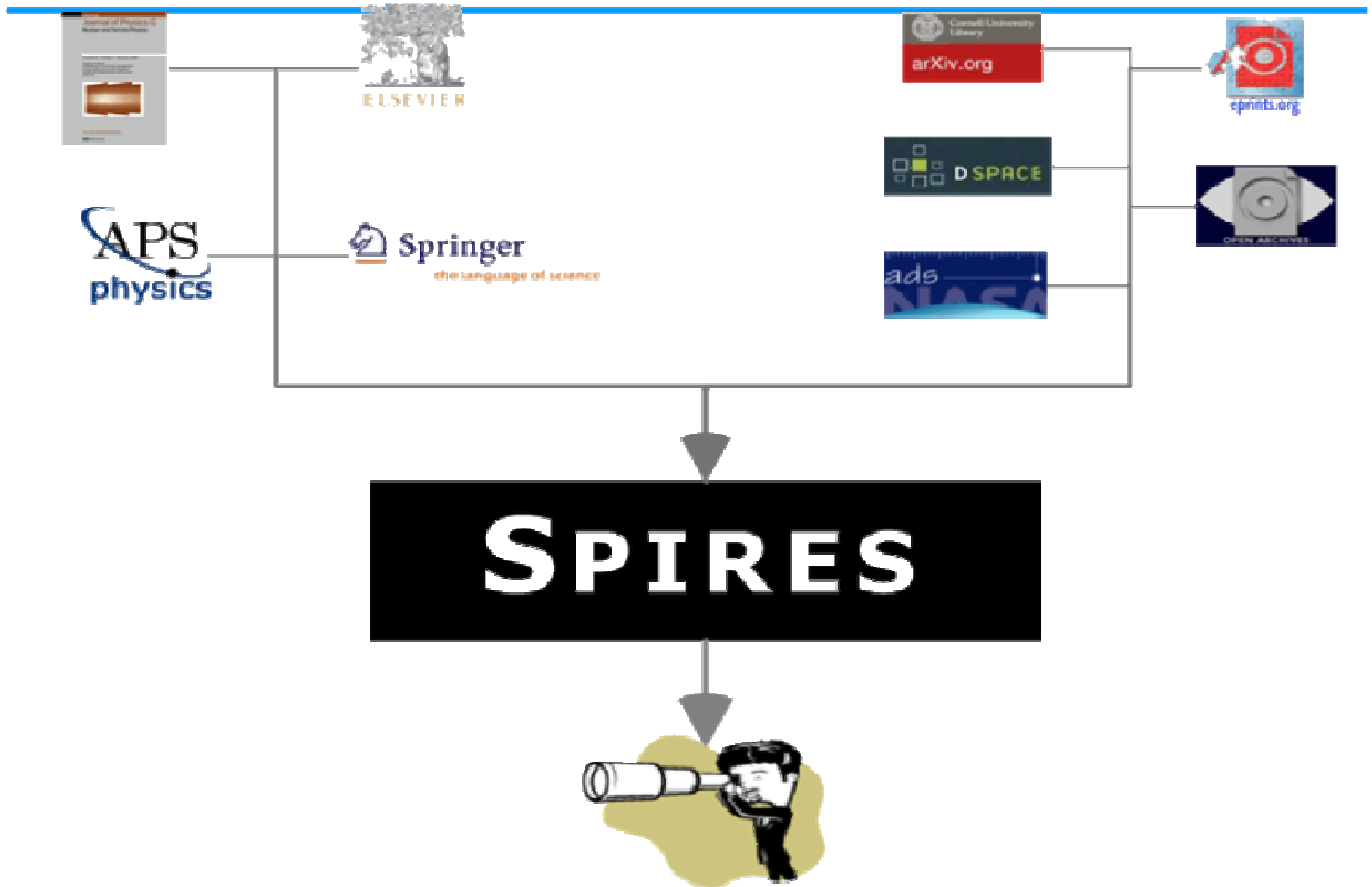
Distributions for $E_{cm}=3.0$ GeV of (a) track momentum; (b) track $\cos \theta$; (c) total energy deposited in the BSC; and (d) event vertex position along the beam (z) axis. Histograms and dots in (a)-(c) represent Monte Carlo and real data, respectively; the beam associated background in (c) has been removed by sideband.

INSPIRE and Repositories

- Define a consistent API
 - Federating searches
 - generating bibliometrics (on the grid, even!)
 - metrics for organizations
- Will use open standards for metadata exchange
 - SWORD populating other repositories
 - OAI-PMH for harvesting and exposing
 - OAI-ORE for Tags/Comment, Data and other objects
 - Start on preprints..continue through journal

INSPIREing Future

- INSPIRE continues the tradition of discipline repositories in HEP
- HEP discipline repositories are not add-ons or afterthoughts, but a part of the **Infrastructure**
 - With users as active partners
 - With user needs forefront in the design and operation
 - Built by a community, for a community



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Infrastructure

- The basic facilities, **services** and installations **needed** for the functioning of a **community** or society *wiktionary.org*

Questions?

- For more information on INSPIRE see

<http://www.projecthepinpire.net>