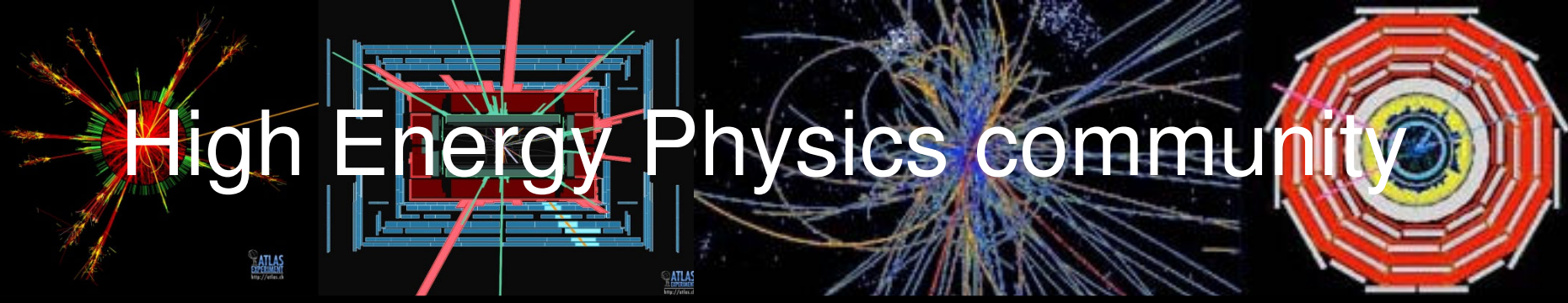




How High Energy Physicists search and read information?

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High Energy Physics community

HEP aims to understand how our Universe works:

- Experimental HEP : builds the largest scientific instruments ever to reach energy densities close to the Big Bang
- Theoretical HEP predicts and interprets the observed phenomena

Small and connected community

- 30,000 scientists
- In total, 5000-7000 articles per year
- > 10 journals
- International collaborations
- Large collaborations for experimental HEP



HEP and grey literature

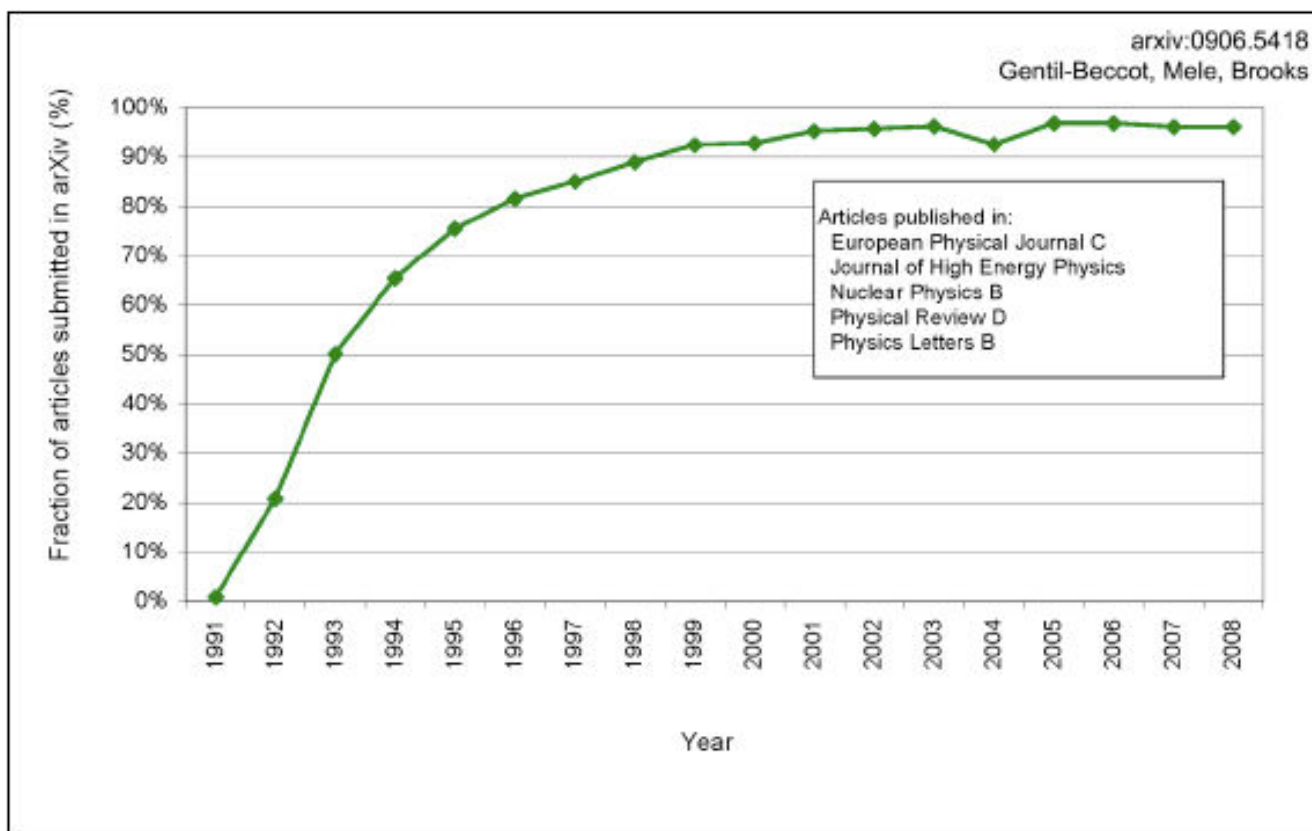
- In the '60s, HEP scientists could not wait ~1 year for their articles to reach their peers through journals
- *Grey literature* as main vehicle of information in HEP
- Researchers (of affluent institutions) mass-mailed preprints to hundreds of (prestigious and therefore affluent) institutions
- HEP community creates its working tools:
 - SPIRES: First e-catalogue of grey literature in 1974 (SLAC, Stanford), with WWW, became an online database
 - metadata-only for all HEP literature for over 30 years.
 - jointly compiled together with DESY (Hamburg), Fermilab (Chicago)
 - adds many information to the basic data: citation data (eprints and published articles), keywords, classifications, authors and institutional affiliations.
 - First preprint repository (arXiv.org, Los Alamos, 1991)
 - CDS (1993)

L.Goldschmidt-Clermont, 1965, http://eprints.rclis.org/archive/00000445/02/communication_patterns.pdf

L. Addis, 2002, <http://www.slac.stanford.edu/spires/papers/history.html>

R.Heuer *et al*, <http://arXiv.org/abs/0805.2739>

arXiv population

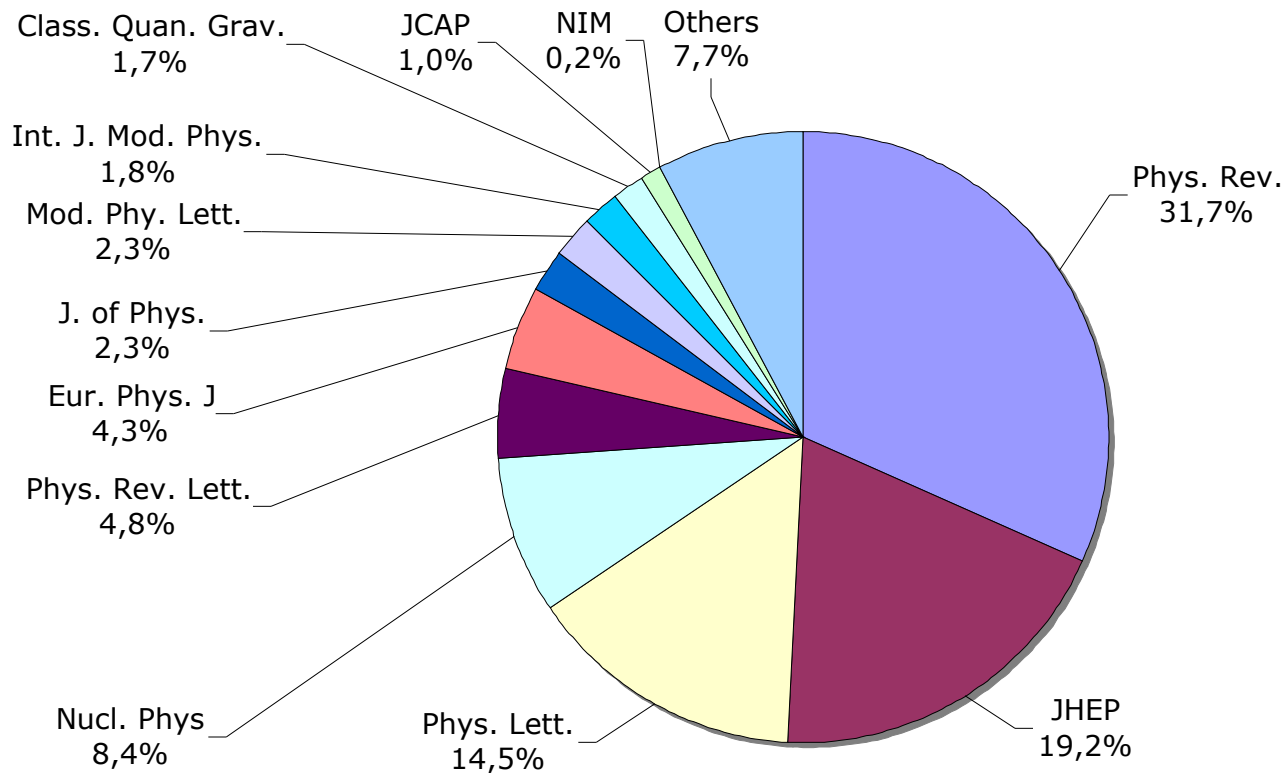


Grey literature, second nature: posting to arXiv before even submitting to a journal is common practice

- No mandate, no debate, no advocacy. Author-benefit driven
- Author-formatted peer-reviewed revisions routinely uploaded
- All publishers allow self-archiving. APS hosts an arXiv mirror!

HEP publishing landscape

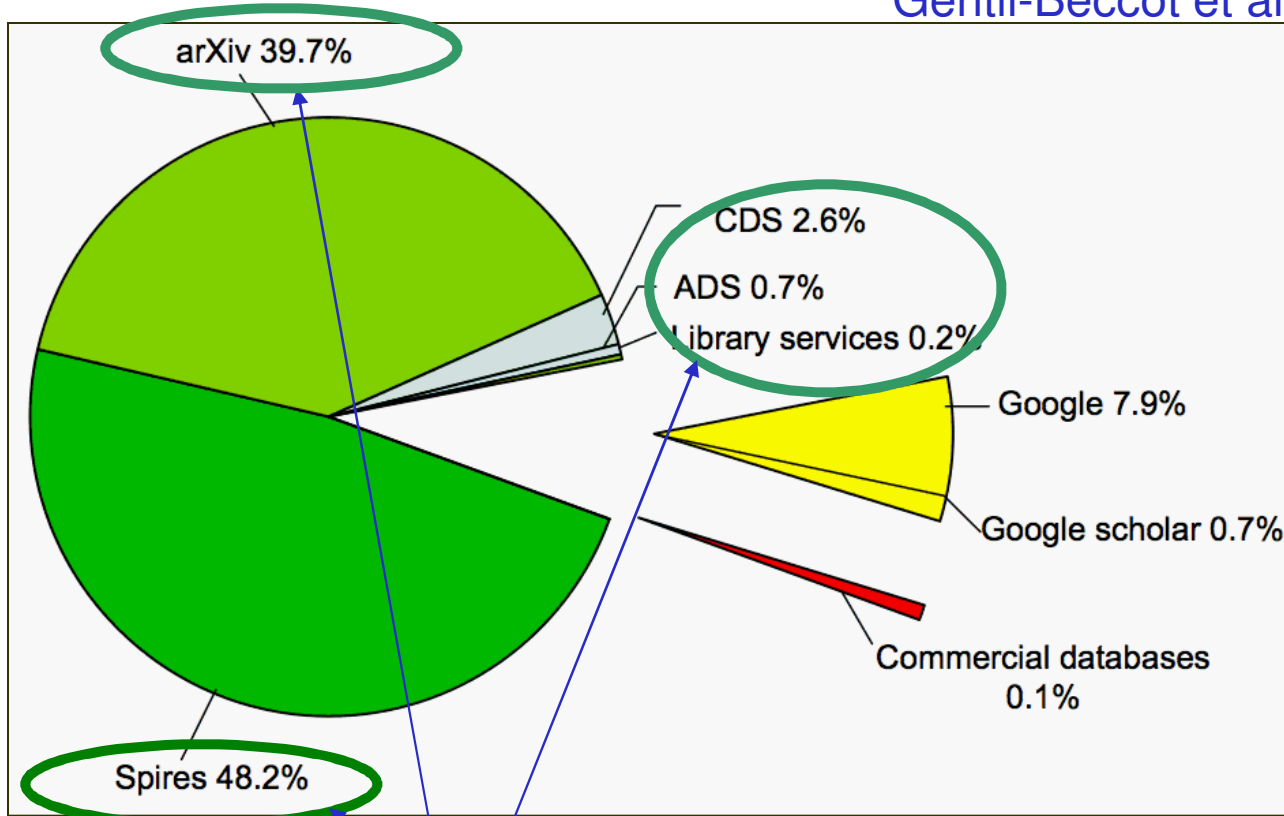
Source: SPIRES, 2006



- 5000-7000 HEP articles/year, according to definition of HEP
- Few journals

Preferred HEP information system?

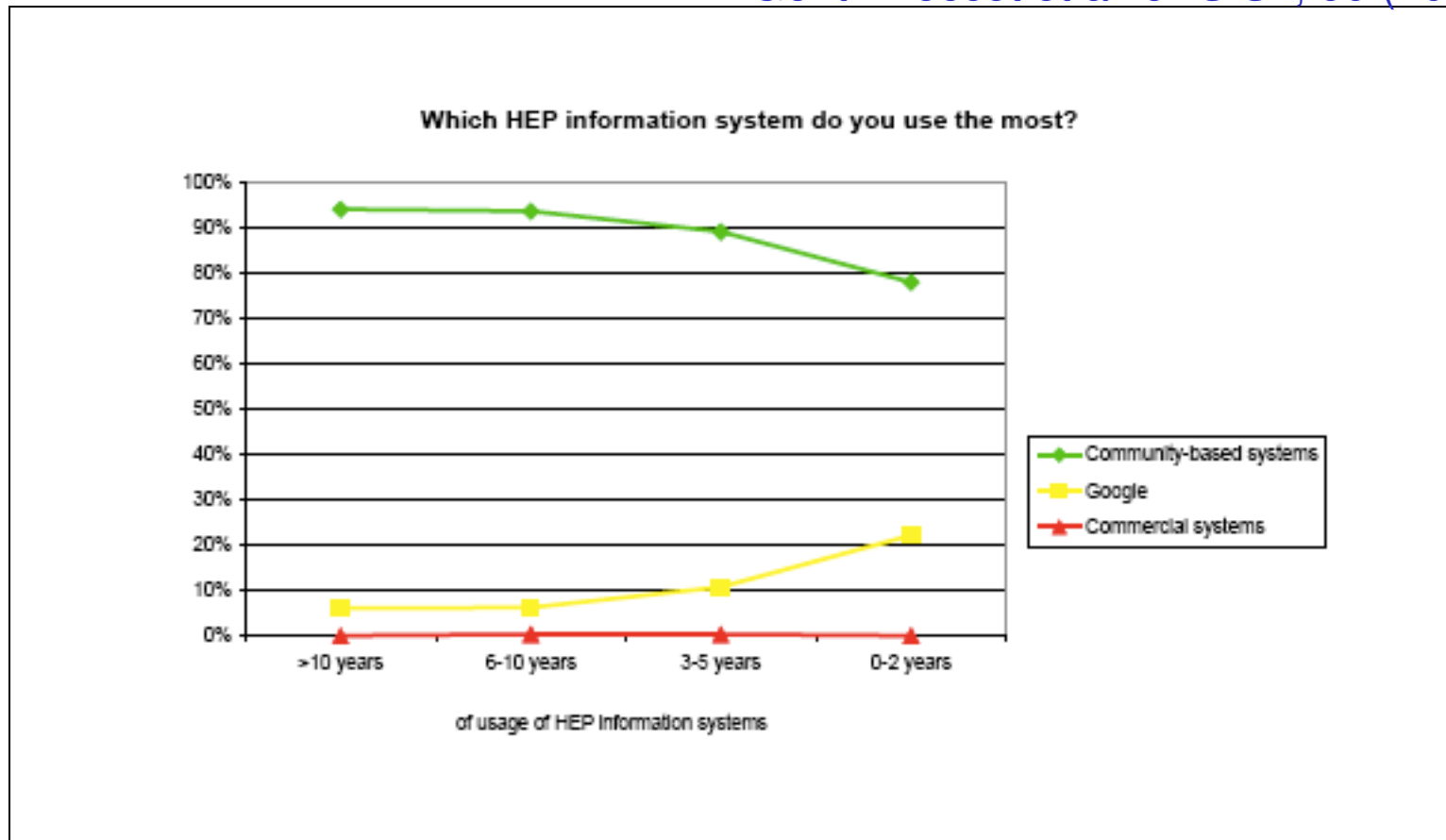
Gentil-Beccot et al. JASIST, 60 (2009)



91% of the users prefer arXiv or Spires (or other community-based systems) to search information

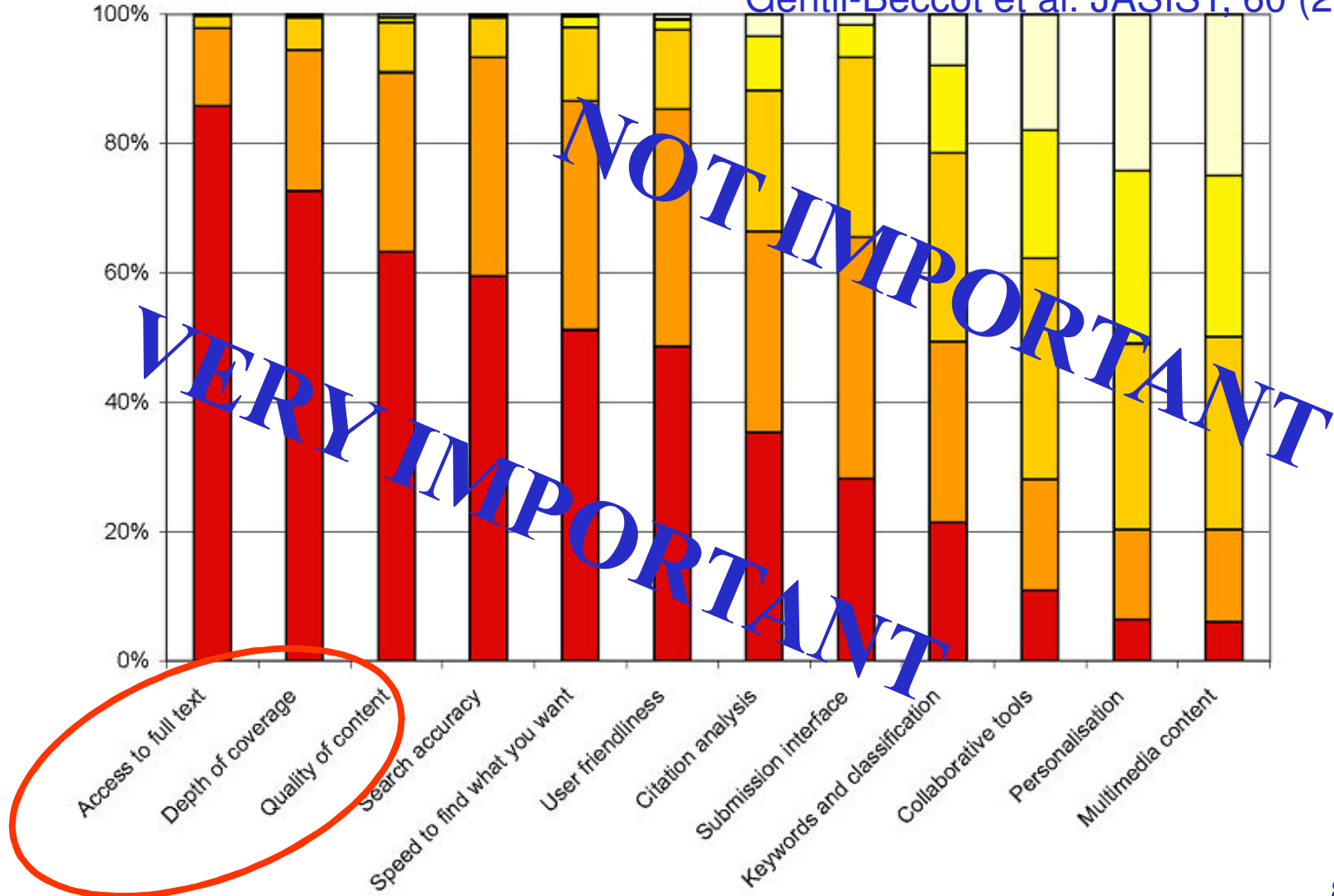
Usage of as function of experience

Gentil-Beccot et al. JASIST, 60 (2009)

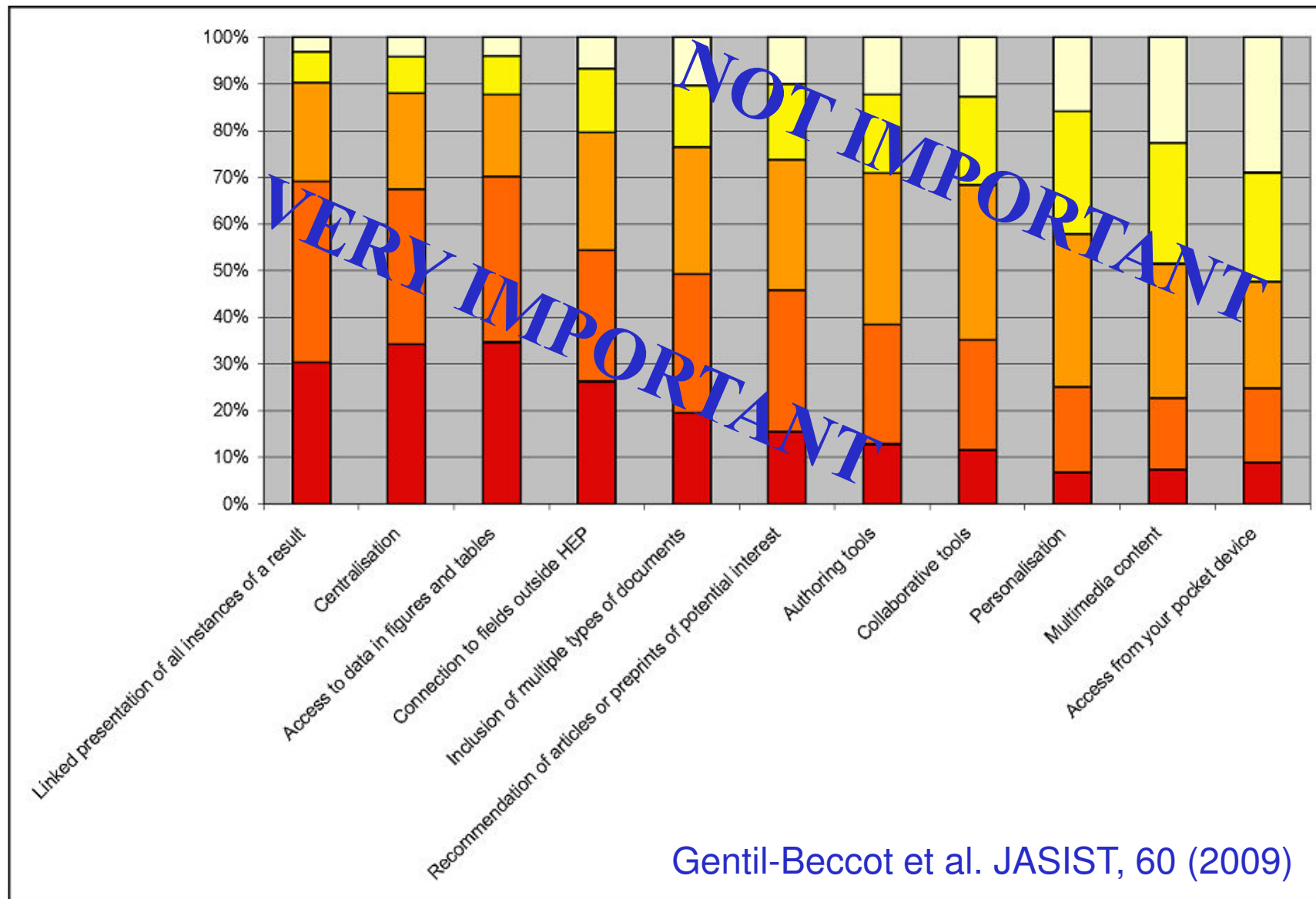


What feature is important in a HEP information system?

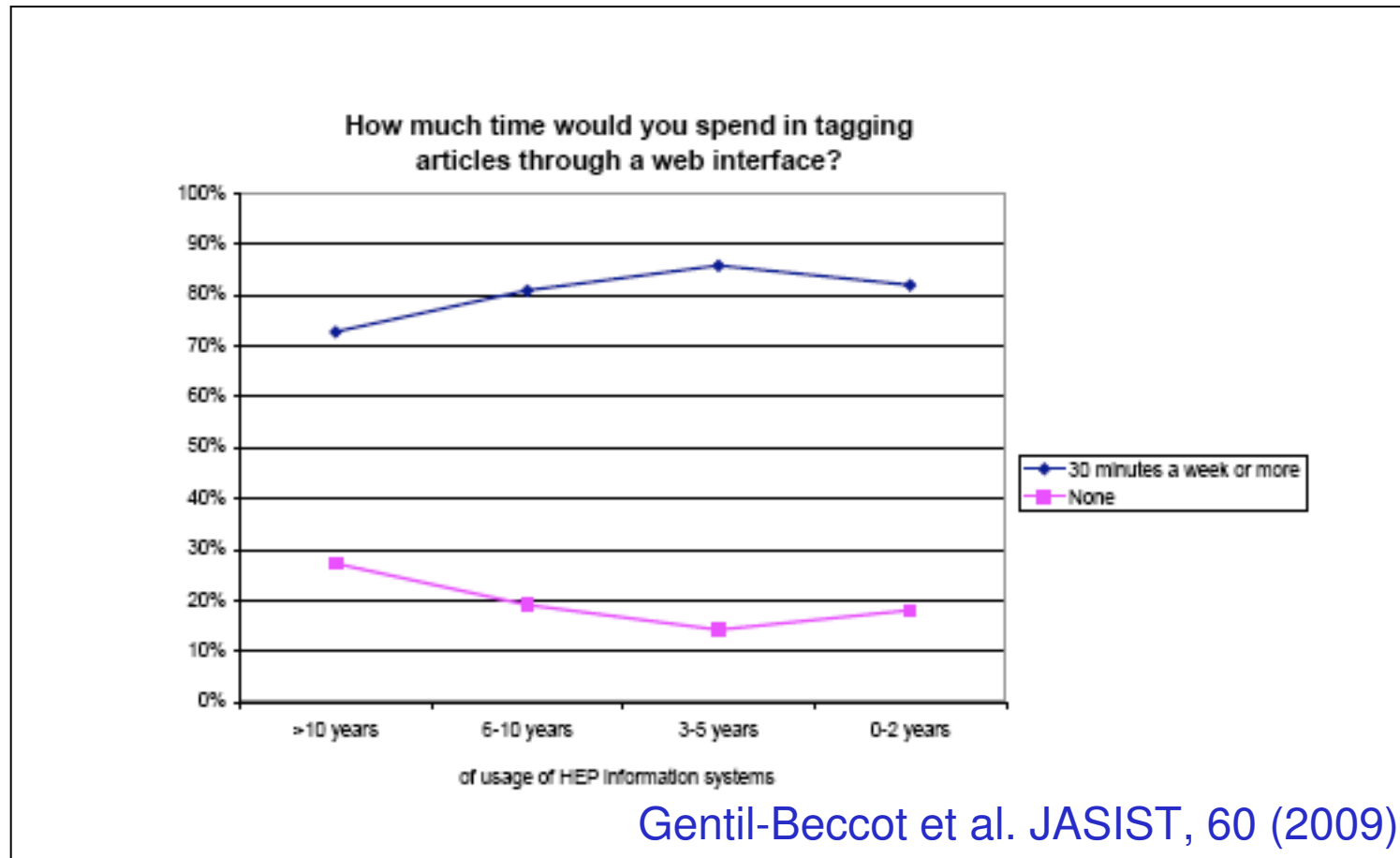
Gentil-Beccot et al. JASIST, 60 (2009)



Some expectations for the future...



User tagging



Conclusion (1)

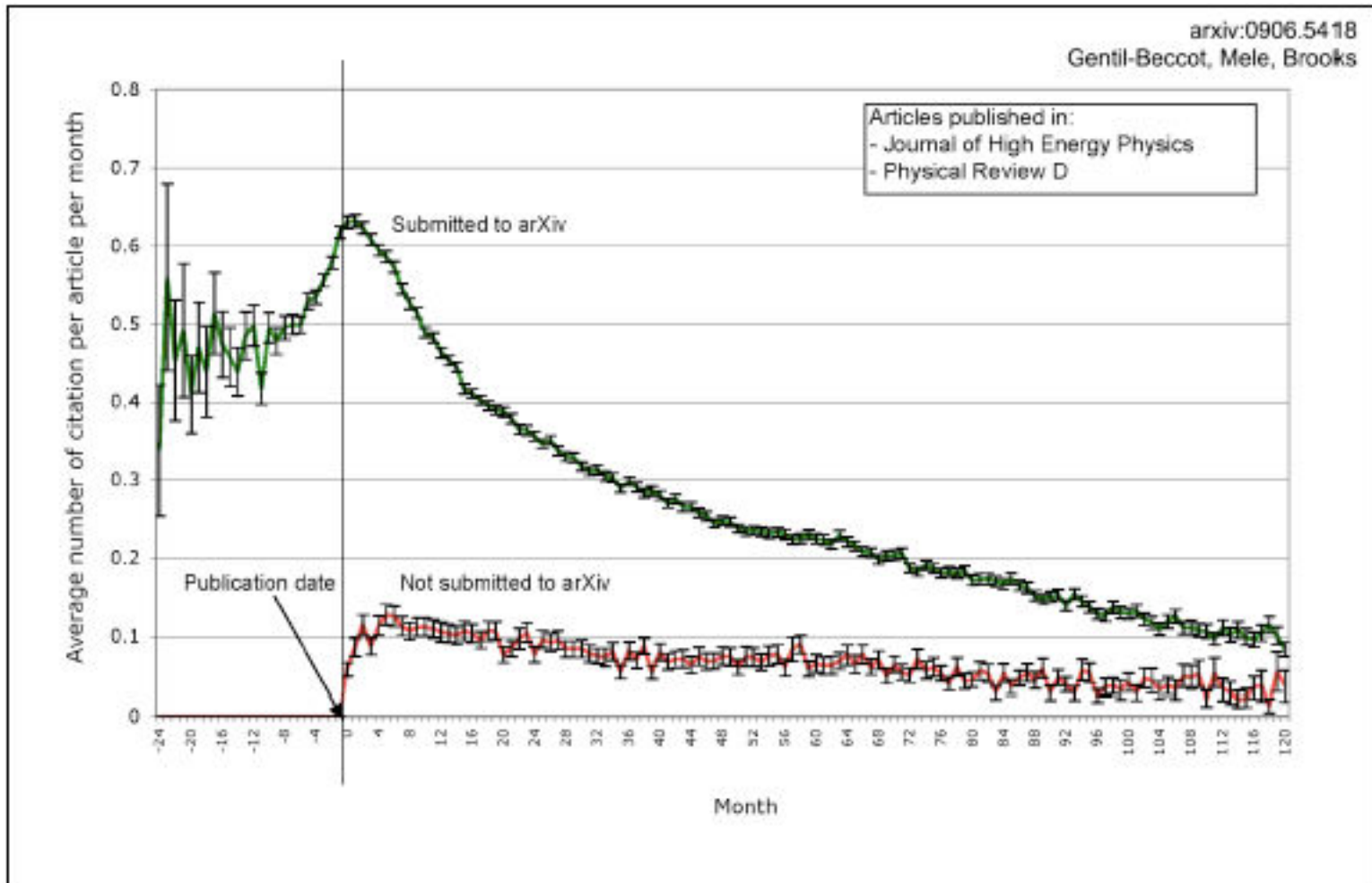
- Physicists search information with the tools provided by the community.
- The community is able to answer its own needs. (SPIRES and arXiv)
- **Future: INSPIRE!**
 - Create a single information service for the entire community => INSPIRE
 - Include new features (web 2.0, more content (theses, conferences, data) and more...

Advantage of arXiv

Citation analysis: 26,000 papers

Average number of cites per article per month before/after publication

J. High Energy Phys. and Phys. Rev. D, 1997-2008



Advantage of arXiv (2)

Citation analysis: 5000 articles

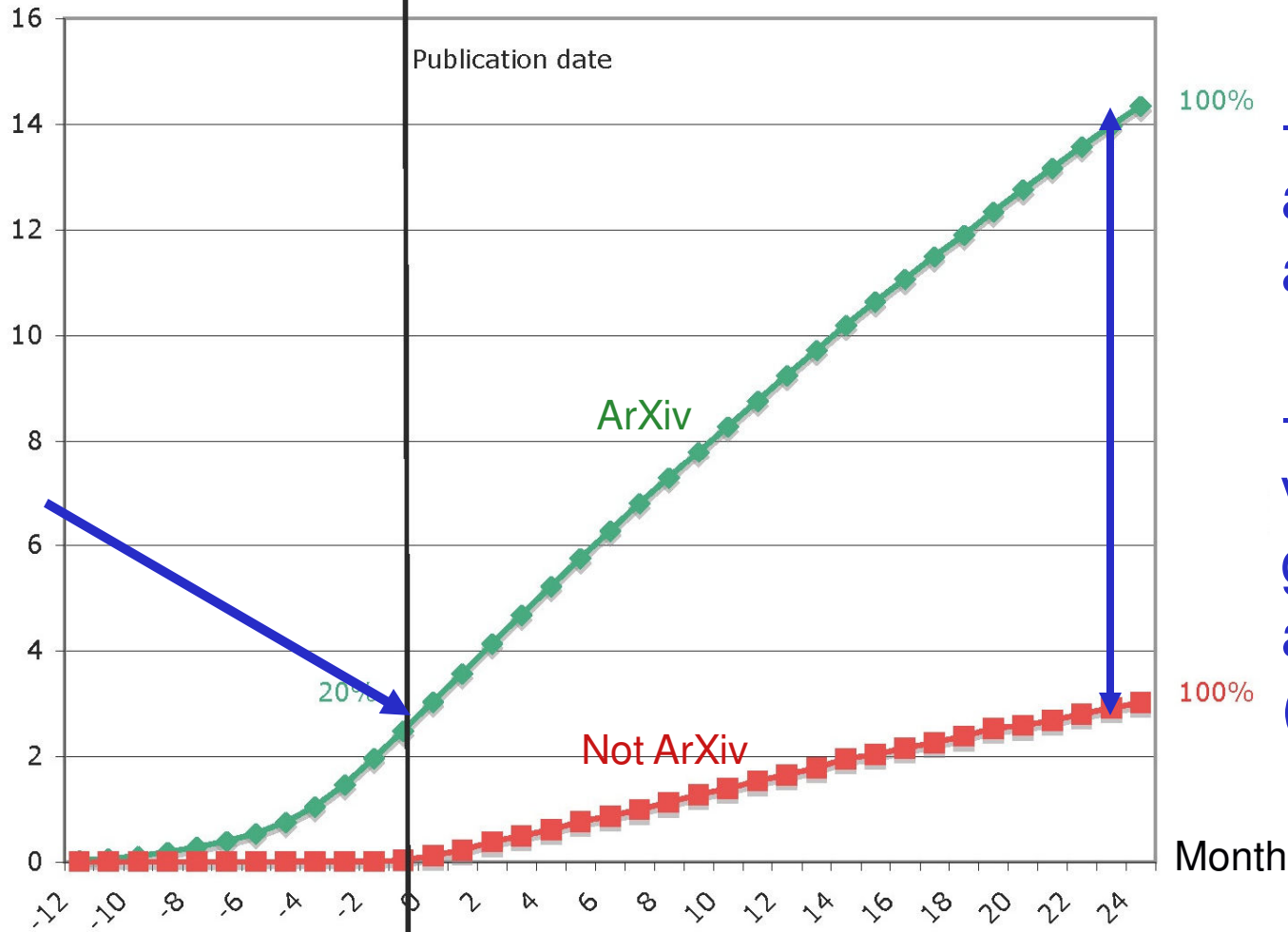
Source:SPIRES

Cumulative number of cites per article before/after publication, year 2005

J. High Energy Phys., Phys. Rev. D, Eur. Phys. J. C, Phys. Lett. B, Nucl. Phys. B

Cumulative cites/article

Publication lag: 4.7 month



-Unrecoverable advantage of arXiv

-Overall larger visibility which goes on even after publication (Quality bias?)

Some journals usage statistics

- 4000 HEP scientists, 5 institutes
- Usage statistics 2006

	Average number of downloads per potential user and publication year
Journal A	0.1
Journal B	0.1
Journal C	0.4
Journal D	0.6
Journal E	0.4

(Journals already mentioned in the previous pages...)

Usage logs: where do SPIRES users click when they find a document? (1)

1) **Five-Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Cosmological Interpretation.**
By WMAP Collaboration (E. Komatsu *et al.*). Mar 2008. 49pp.
e-Print: [arXiv:0803.0547](#) [astro-ph]

TOPCITE = 500+

[References](#) | [LaTeX\(US\)](#) | [LaTeX\(EU\)](#) | [Harvmac](#) | [BibTeX](#) | Cited [595 times](#)
[Abstract](#) and [Postscript](#) and [PDF](#) from arXiv.org (mirrors: [au](#) [br](#) [cn](#) [de](#) [es](#) [fr](#) [il](#) [in](#) [it](#) [jp](#) [kr](#) [ru](#) [tw](#) [uk](#) [za](#) [aps](#) [lanl](#))
[EXP WMAP](#)
[Bookmarkable link to this information](#)

2) **Five-Year Wilkinson Microwave Anisotropy Probe (WMAP) Observations: Likelihoods and Parameters from the WMAP data.**
By WMAP Collaboration (J. Dunkley *et al.*). Mar 2008. 57pp.
e-Print: [arXiv:0803.0586](#) [astro-ph]

TOPCITE = 250+

[References](#) | [LaTeX\(US\)](#) | [LaTeX\(EU\)](#) | [Harvmac](#) | [BibTeX](#) | Cited [270 times](#)
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[EXP WMAP](#)
[Bookmarkable link to this information](#)

3) **Observational Constraints on the Nature of the Dark Energy: First Cosmological Results from the ESSENCE Supernova Survey.**
By ESSENCE Collaboration (W. Michael Wood-Vasey *et al.*). SLAC-PUB-12281, Jan 2007. 82pp.
Published in *Astrophys.J.* **666:694-715,2007.**
e-Print: [astro-ph/0701041](#)

TOPCITE = 250+

[References](#) | [LaTeX\(US\)](#) | [LaTeX\(EU\)](#) | [Harvmac](#) | [BibTeX](#) | Cited [262 times](#)
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[Journal Server](#)
[ADS Abstract Service](#)
[PhysOrg.com article](#)
[SLAC Document Server](#)
[Bookmarkable link to this information](#)

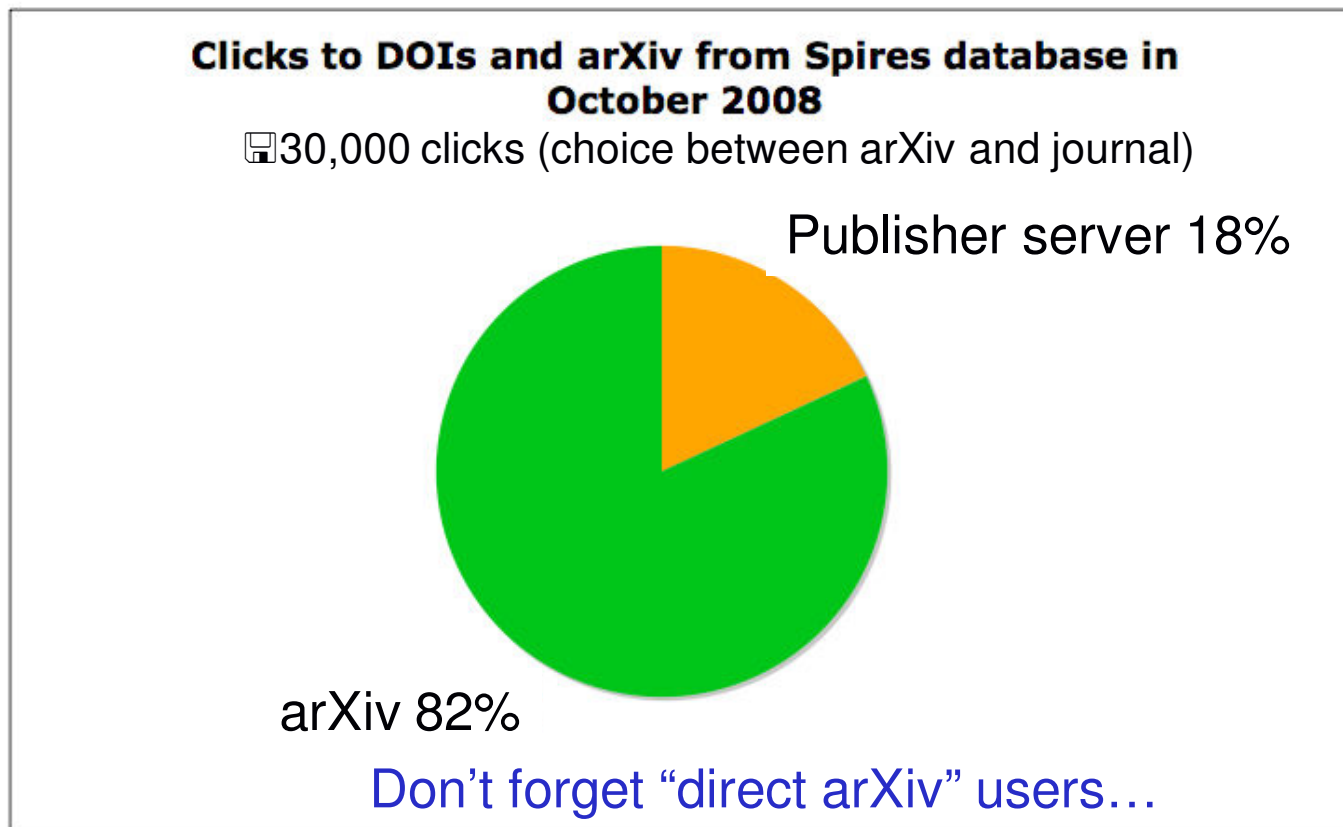
4) **Unparticle physics.**
Howard Georgi (Harvard U., Phys. Dept.). Mar 2007. 7pp.
Published in *Phys.Rev.Lett.* **98:221601,2007.**
e-Print: [hep-ph/0703260](#)

TOPCITE = 100+

[References](#) | [LaTeX\(US\)](#) | [LaTeX\(EU\)](#) | [Harvmac](#) | [BibTeX](#) | [Keywords](#) | Cited [222 times](#)
[Abstract](#) and [Postscript](#) and [PDF](#) from arXiv.org (mirrors: [au](#) [br](#) [cn](#) [de](#) [es](#) [fr](#) [il](#) [in](#) [it](#) [jp](#) [kr](#) [ru](#) [tw](#) [uk](#) [za](#) [aps](#) [lanl](#))
[Journal Server](#)
[PhysOrg.com article](#)
[Bookmarkable link to this information](#)



Usage logs: where do SPIRES users click when they find a document? (2)



Should I cancel all HEP journals subscribed by CERN Library?

- Of course not!
- (Most) authors (still) publish in peer reviewed journals
 - Peer review system is felt as crucial for HEP as for other sciences
 - Evaluations of scientists proceed as in all other fields, through journals
 - Journals perform quality assurance and are the keepers of the records
 - Journals are the "interface" of HEP scientists to officialdom

Conclusions (2)

- HEP journals are no longer used for HEP work!
 - Discovery of information in GL - immediate communication
 - Actual reading in GL
- But journals and their peer-review system keep a crucial role as interface with officialdom
- SCOAP³ (<http://scoap3.org>)
 - Convert high quality HEP journals to Open Access by redirecting subscription funds
 - Openly, fairly and pay for the peer-review service, rather than access

Readings

- Information Resources in High-Energy Physics. Gentil-Beccot, Mele. Holtkamp, O'Connell, Brooks. In JASIST, 60 (2009).
- Citing and reading behaviours in High Energy physics. Gentil-Beccot, Mele, Brooks. arXiv:0906.5418