

# Open Access Publishing in High-Energy Physics: a practical approach

- HEP & OA: a synergy
- The SCOAP<sup>3</sup> model
- Conclusions & outlook

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**scoap3.org**

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<http://cern.ch/oa/Scoap3ExecutiveSummary.pdf>

<http://cern.ch/oa/Scoap3WPReport.pdf>

# High-Energy Physics (or Particle Physics)

HEP aims to understand how our Universe works:

- by discovering the most elementary constituents of matter and energy
- by probing their interactions
- by exploring the basic nature of space and time

in other words, try to answer two eternal questions:

- "What is the world made of?"
- "What holds it together?"

Build the largest scientific instruments ever to reach energy densities close to the Big Bang; write theories to predict and describe the observed phenomena

# CERN: European Organisation for Nuclear Research (since 1954)

- The world leading HEP laboratory, Geneva (CH)
- 2500 staff (mostly engineers)
- 8000 users (mostly physicists)
- 3 Nobel prizes (Accelerators, Detectors, Discoveries)
- Invented the web
- Completing the 27-km (6000 M€) LHC accelerator
- Runs a 1-million objects Digital Library
- Recently gave OA to the 11'000 articles on Theoretical physics written in the last 53 years

CERN Convention (1953) contains an *ante-litteram* OA manifesto:  
“... the results of its experimental and theoretical work shall be published or otherwise made generally available”

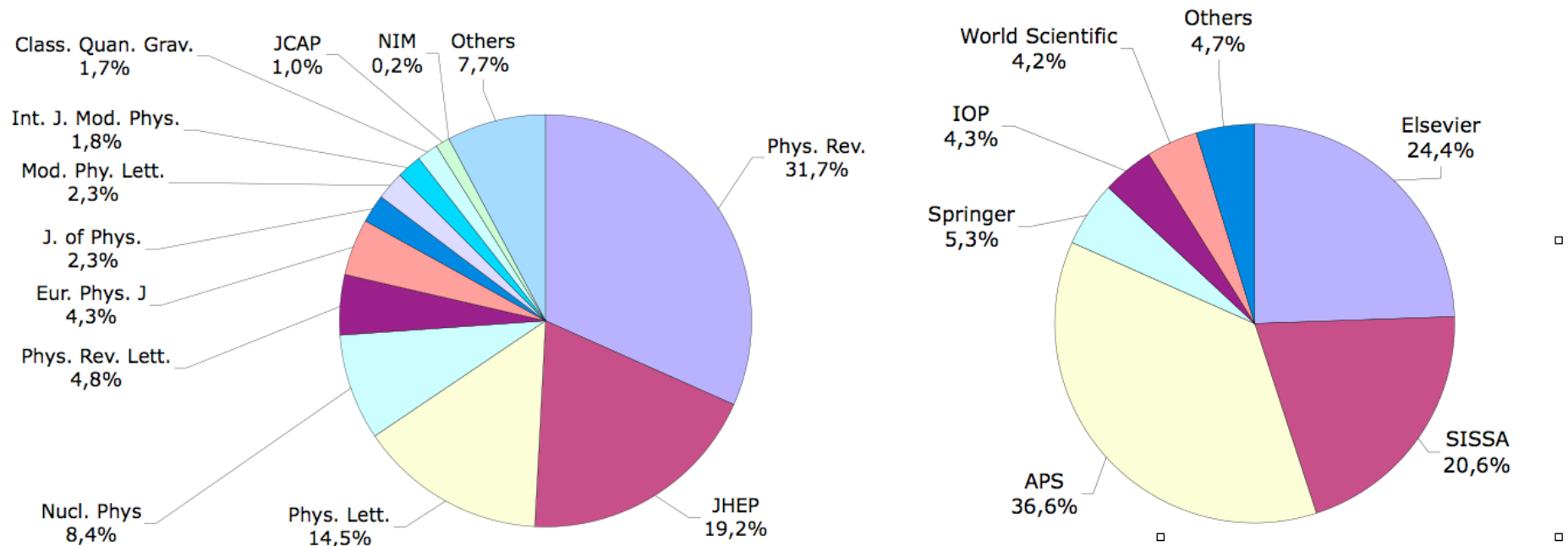
# The unique situation of HEP

- HEP is decades ahead in thinking Open Access:
  - Mountains of paper preprint shipped all over the world by HEP institutes for 40 years (at author/institute expenses!)
  - HEP launched arXiv (1991), the archetypal Open Archive
  - The first free peer-reviewed electronic journals:
    - *Journal of High Energy Physics* (1997) • *Physical Review Special Topics Accelerators and Beams* (1998) • *New Journal of Physics* (1998)
- Small and connected community (<20000 scientists)
- Small scientific output (<10000 articles)
- Small publishing landscape (< 10 journals)
- Reader and author communities largely overlap
- “Green” OA is second nature: posting on arXiv before even submitting to a journal is common practice.
  - No mandate, no debate. Author-driven. Evident benefits

# The HEP publishing landscape

S.Mele *et al.* JHEP 12(2006)S01 arXiv:cs.DL/0611130

5016 articles submitted to arXiv:hep in 2005 and published in peer-reviewed journals



90% of articles are in theory and by less than 3 authors  
83% of articles published in 6 leading journals  
87% of articles published by four publishers  
57% of articles by not-for-profit (nor-for-loss) publishers

# HEP and its journals

- Journals (with their vaguely anachronistic page and figure limits) are on the way to lose (lost?) a century-old role as vehicle of scholarly communication.
- Still, evaluation of institutes and (young) researchers is based on high-quality peer-reviewed journals.
- The main role of journals is to assure high-quality peer-review and act as keepers-of-the-records
- The HEP community needs high-quality journals, our “interface with officialdom”
- Implicitly, the HEP community supports this role by purchasing subscriptions, as it reads off arXiv anyhow
- As an “all-arXiv discipline” HEP is at high risk to see its journal canceled by large multidisciplinary university libraries (when not already happened)

# HEP and Open Access

**After arXiv and the web,  
Open Access journals  
are the natural evolution of  
HEP scholarly communication**



# Is it all about vocal librarians?

## Strong support from the LHC collaborations

*"We, the   \*   Collaboration, strongly encourage the usage of electronic publishing methods for   \*   publications and support the principles of Open Access Publishing, which includes granting free access of our   \*   publications to all. Furthermore, we encourage all   \*   members to publish papers in easily accessible journals, following the principles of the Open Access Paradigm."*

5400 scientists  
building the largest  
scientific instruments ever

  \*   { ATLAS; approved on 23rd February 2007  
CMS; approved on 2nd March 2007  
ALICE; approved on 9th March 2007  
LHCb; approved on 12th March 2007



# Current Models of OA publishing in HEP (I)

**Author-pays:** all content of the journal is free to read. After acceptance, authors pay journals for processing fees.

- *New Journal of Physics* (IOP) since 1998, but attracted only a small HEP fraction, with 20 articles/year
- Limited success due to lack of paying mechanisms?
- Tried again by PhysMathCentral *Physics A*, a new HEP journal now accepting submissions (spin off of BioMedCentral)

**Hybrid model:** authors can pay journals to make their articles free to read. The rest of the journal is still behind subscription gates. Offered by all leading publishers.

- Prices range from 750€ to 3,000€.
- Negligible success, lack of funding mechanisms?
- “Why pay for something you can get for free?” [the peer review]
- “Why paying twice with OA charges on top of subscription fees?”

# Current Models of OA publishing in HEP (II)

**Sponsoring model:** institutions fund journals. No author charges. All content free to read.

- *Physical Review Special Topics Accelerators and Beams (APS)* since 1998
- “Niche” journal with ~150 article/year and budget ~150'000\$/year
- 11 labs worldwide. Longest (only?) success story in HEP OA.
- Is it scalable?

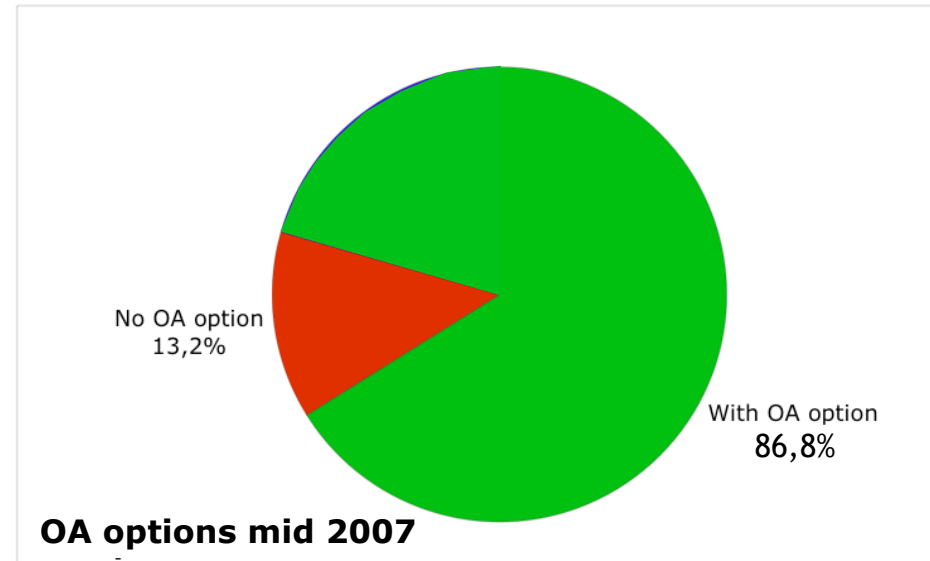
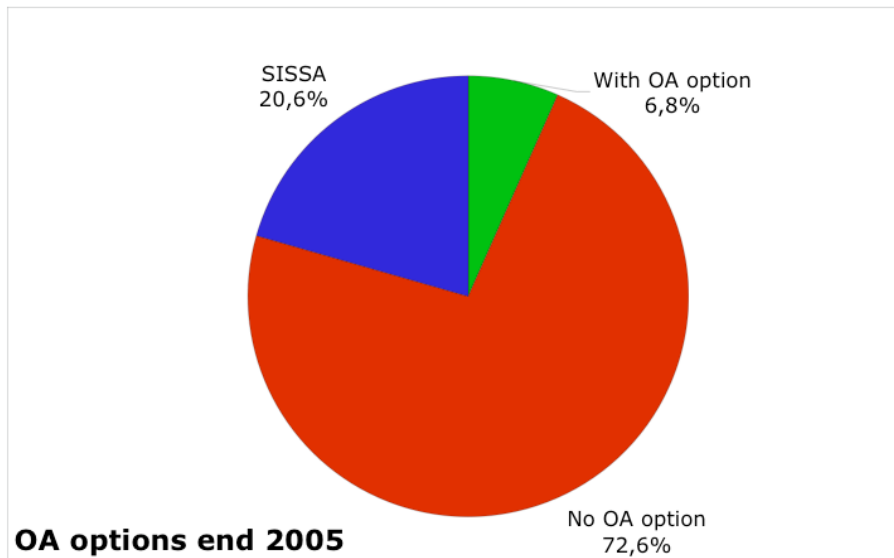
**Institutional membership:** institutions who wish to do so pay premium subscriptions proportional to their output and articles with at least one affiliated authors are OA.

- *Journal of High Energy Physics* and *Journal of Instrumentation* (SISSA/IOP) since 2007. Pricing tiers: 200\$-500\$/article.
- Well received by labs and OA-aware authors (who can publish OA without direct costs)
- Is it scalable? Pilot project in France: CNRS/IN2P3 as an institutional member covering all publications with at least a French author.

# Expansion of OA offers from 2005 to 2007

## Published articles by journal OA policy:

had authors wanted, could their articles be published OA?



5015 articles submitted to hep-ex, hep-ph, hep-lat and hep-th in 2005 and subsequently published in peer-reviewed journals

- These articles were NOT OA. Had funding mechanism been in place, they would have been.
- Publishers expand their OA options as a consequence of the debate on OA within the HEP community.

# The SCOAP<sup>3</sup> model

Sponsoring Consortium for Open Access Publishing  
in Particle Physics

A circular visualization of particle tracks, likely from a detector like ATLAS or CMS, showing a central collision point with many tracks radiating outwards. The tracks are colored in shades of purple, blue, and pink, set against a green background.

**A practical approach:**  
How to publish OA  
about 5'000 articles/year,  
produced by a community  
of about 20'000 scientists?

# Towards the SCOAP<sup>3</sup> consortium

- Tripartite task force of HEP funding agencies, publishers and authors indicated sponsoring as a way to achieve Open Access publishing in HEP
- European HEP funding agencies, library consortia and the research community charged a Working Party to propose a blueprint for a sponsoring consortium

Towards Open Access Publishing  
in High Energy Physics

Report of the SCOAP<sup>3</sup> Working Party

The SCOAP<sup>3</sup> Working Party\*

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<http://cern.ch/oa/Scoap3WPReport.pdf>  
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# SCOAP<sup>3</sup> in one line

**A consortium sponsors HEP publications and makes them OA by re-directing subscription money.**

Today: (funding bodies through) libraries buy journal subscriptions to support the peer-review service and to allow their patrons to read articles.

Tomorrow: funding bodies and libraries contribute to the SCOAP<sup>3</sup> consortium, which pays centrally for the peer-review service. Articles are free to read for everyone.

**A mix of sponsoring and institutional membership,  
on a world-wide scale**



# Pillars of the SCOAP<sup>3</sup> model (I)

## What ?

- Online journals free to read for anybody, anywhere, anytime.
- Preserve high-quality peer-review process.
- Generate medium- and long-term savings for libraries and funding agencies by linking price with quality.
- Publishers receive and process articles as they do now, but make the final version available OA (and feed it to a SCOAP<sup>3</sup> database, harvested by others) and receive financial compensation by SCOAP<sup>3</sup> for this quality-assurance service.
- Publishers continue to meet demand for additional *premium* products to interested libraries and/or authors (paper journals, reprints, color pages, ...).



# Pillars of the SCOAP<sup>3</sup> model (II)

## Who ?

- HEP funding agencies and library consortia worldwide.
- Publishers interested in the transition of their journals to OA.
- Achieve OA in a way financially transparent for authors, who have to be nonetheless proactive in their choices of journals.
- Most publishers of high-quality HEP journals are expected to be ready to enter negotiations provided long-term funding is available for SCOAP<sup>3</sup>.

# Pillars of the SCOAP<sup>3</sup> model (III)

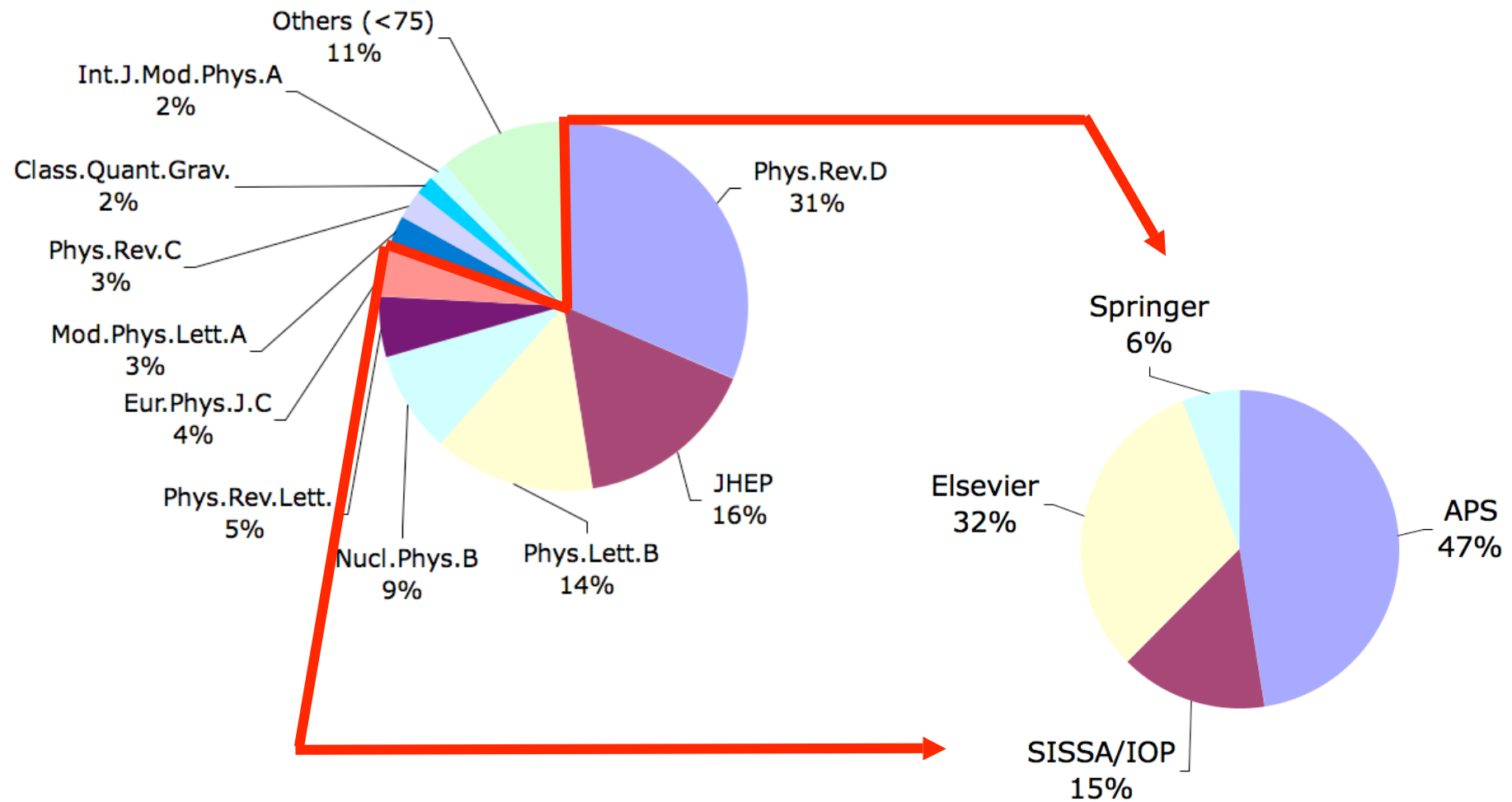
## How ?

- Assist publishers to convert existing high-quality peer-reviewed journals to Open Access.
- Do not ask individual authors/groups to directly pay to publish their articles Open Access.
- No “paying twice” for Open Access and subscriptions.
- Exploit the fact that in HEP the reader and the author communities largely overlap.
- Federate HEP funding agencies and library consortia worldwide.
- Re-direct money used for subscriptions to SCOAP<sup>3</sup>: a single commercial partner for publishers.

# Towards Open Access journals

- Six journals cover 80% of central HEP literature
- Five “core” journals: *Physical Review D (APS)*, *Journal of High Energy Physics (SISSA/IOP)*, *Physics Letters B & Nuclear Physics B (Elsevier)*, *European Physical Journal C (Springer)*
  - Carry a majority of HEP content
  - 10%-30% Nuclear Physics and Astroparticle Physics
  - Aim to convert them entirely to Open Access
  - Reduce prices of “packages” accordingly
- One “broadband” journal: *Physical Review Letters (APS)*
  - 10% HEP (including Nuclear and Astroparticle Physics)
  - Sponsor the conversion to OA of this fraction
  - Reduce subscription price accordingly
- SCOAP<sup>3</sup> is not limited to this initial set of journals but open to all high-quality HEP journals!

# Potential initial partners of SCOAP<sup>3</sup>



# Guesstimating the budget envelope

- *Physical Review D* (APS) operates with  
**2.7M€/year** (31% of arXiv:hep)
- *Journal of High Energy Physics* (SISSA/IOP) needs  
**~1M€/year** (19% of arXiv:hep)

**HEP Open Access price tag: 10M€/year**

- A published PRD article costs APS **~1500€**
- 6-8 leading journals publish 5000-7000 articles a year

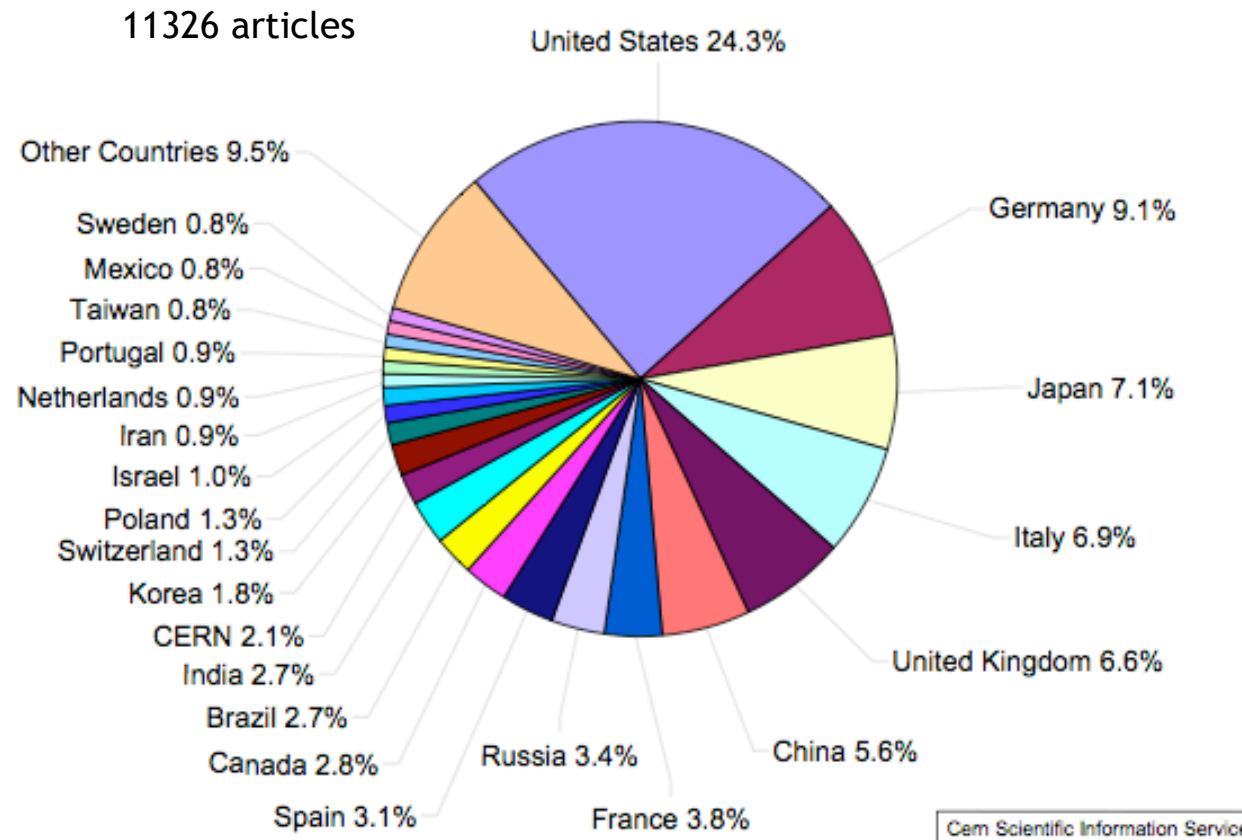
# SCOAP<sup>3</sup> financing

- SCOAP<sup>3</sup> exact yearly cost to be known after a tender is sent to publishers.
- SCOAP<sup>3</sup> financing to be distributed according to a “fair-share” model based on the distribution of HEP articles per country, accounting for co-authorship.
- Make a 10% allowance for developing countries who at the beginning might not contribute to the scheme.
- **The model is viable only if every country is on board!** Allowing only SCOAP<sup>3</sup> partners to publish Open Access simply replicates the subscription scheme and does not solve the problems: need to buy/read what others write.

# A study of HEP authorship in leading journals

J.Krause,C.M.Lindqvist,S.Mele CERN-OPEN-2007-014

**Distribution of HEP articles by country, average 2005-2006**



All HEP “core” journals and HEP fraction of broadband journals.

Co-authorship is taken into account on a *pro-rata* basis by assigning articles to countries according to their number of authors.

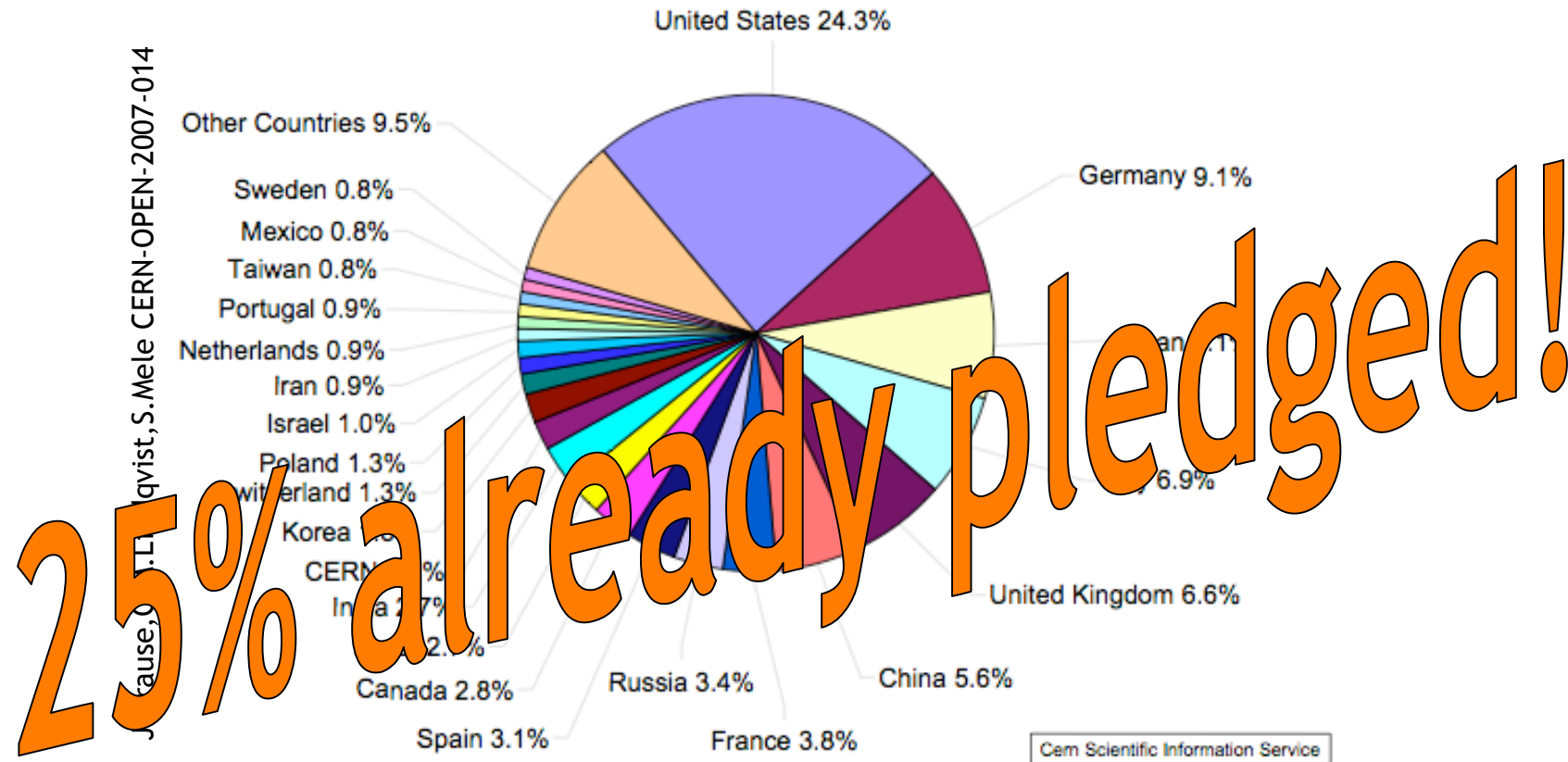


# Next steps

- Formal proposal published in April.
- Solicit and collect expressions of interest of potential funding partners: HEP funding bodies, national library consortia, large national libraries.
- Funding partners identify country-by-country schemes to re-direct journal subscriptions to SCOAP<sup>3</sup>.
- Once funding partners commit to sizeable fraction of budget send a tender to publishers and
  - determine final budget;
  - enlist remaining partners.
- Formal agreement to establish SCOAP<sup>3</sup>.
- Goal: have SCOAP<sup>3</sup> operational for the first LHC articles!

# How far are you?

Distribution of HEP articles by country, average 2005-2006



Italy (INFN), France (CNRS), Germany (MPG+Helmholtz+DFG), Greece (University Alliance) and CERN have already joined. Intense discussions all over “the rest of the pie”, in Europe, Asia and America. What about *\*your\** country? Write to us!

# SCOAP<sup>3</sup> in a nutshell

- Establish Open Access in HEP publishing in a transparent way for authors.
- Convert existing high-quality peer-reviewed journals to Open Access, in a sustainable way.
- Operate along the blueprint of large scientific collaborations.
- Price tag of 10M€/year to be shared according to the distribution of HEP articles per country. 25% of the budget has been pledged in a few weeks!
- The model has high potential but is only viable if every country contributing to HEP is on board!
- Our model could be rapidly generalized to related fields: Nuclear and Astroparticle Physics and exported to many more tightly knit communities.



# Thank you !

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**scoap3.org**

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**Make OA happen, promote SCOAP<sup>3</sup> in your country!**  
**Get in touch!**