Open Access Publishing in High-Energy Physics

- HEP & OA: a synergy
- The SCOAP^3 model
- Financial aspects
- Conclusions & outlook

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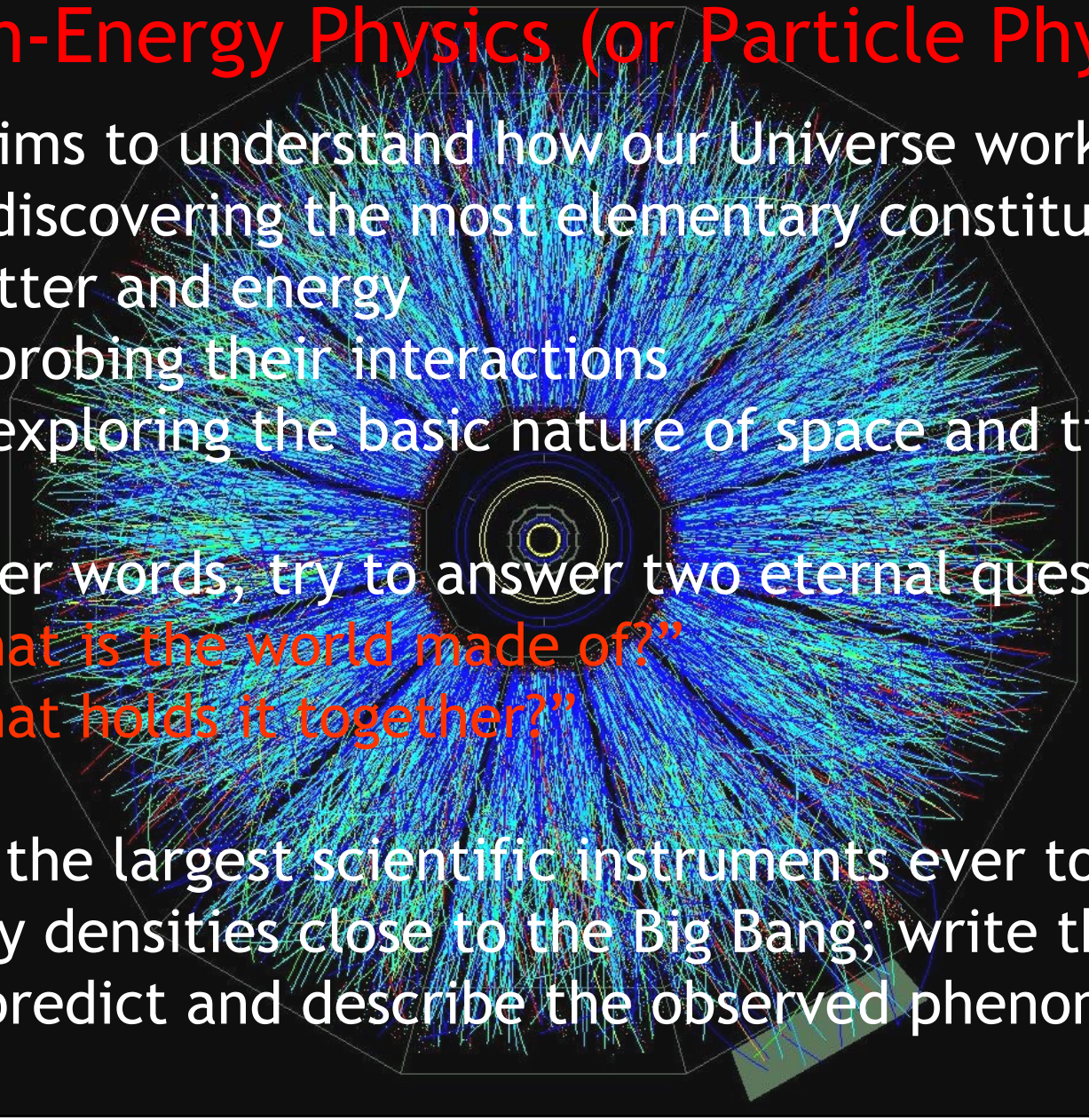
Firenze 17 luglio 2007

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

Lo Standard Model – Paradigma della Fisica Moderna

molecole

↓

atomi

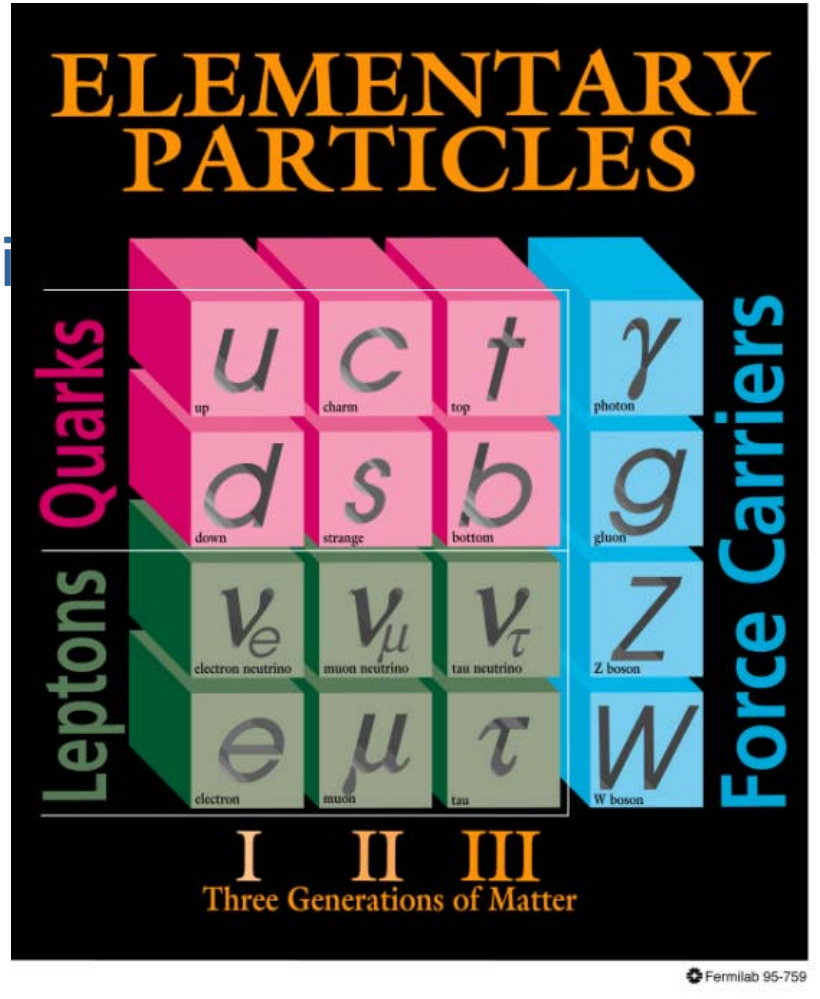
↓

Protoni, neutroni, elettroni

↓

Quark, leptoni

L'ipotesi base dello SM e' che per descrivere la natura siano necessari e sufficienti:
i quark [u,d,s,c,b,t] e
i leptoni [e,μ,τ,ν_e,ν_μ,ν_τ]
organizzati in tre "famiglie",
i mediatori delle interazioni (gravitone ?), ed il bosone di Higgs (?).



INFN oggi

Legnaro

VIRGO-EGO
European
Gravitational
Observatory

Laboratori del Sud
(Catania)

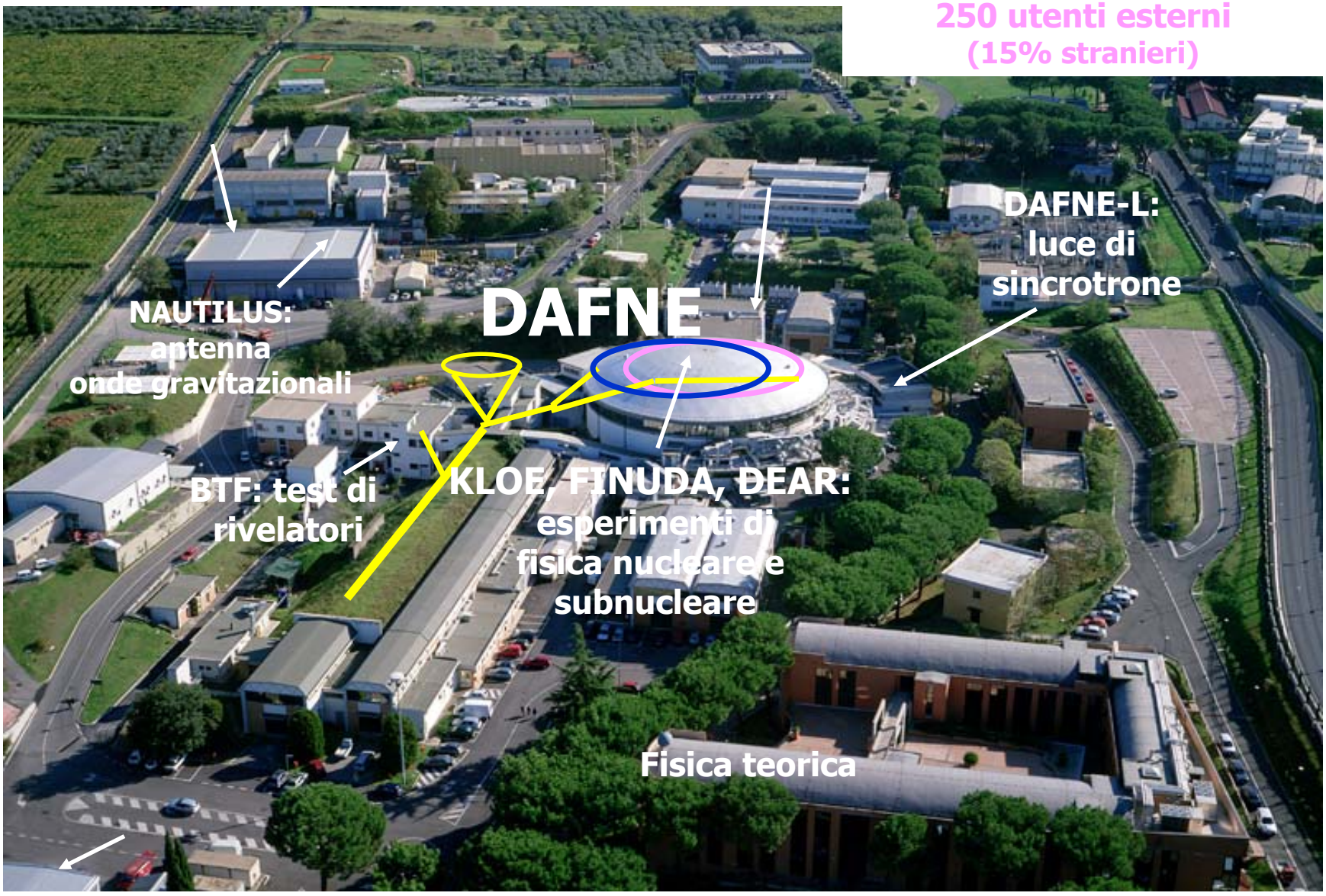
Gran Sasso

19 Sezioni
11 Gruppi collegati
4 Laboratori
Nazionali

Trento
Udine
Trieste
Padova
Milano
Pavia
Brescia
L.N.L
Torino
Alessandria
Parma
Ferrara
Bologna
C.N.A.F
Genova
Firenze
Siena
Pisa
Perugia
L'Aquila
L.N.G.S
Roma1
Roma2
Roma3
Sanita'
L.N.F
Bari
Napoli
Salerno
Lecce
Cosenza
Cagliari
Messina
Catania
L.N.S

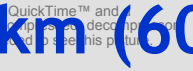
Laboratori Nazionali di Frascati

350 dipendenti
(50% tecnici, 40% ricercatori)
250 utenti esterni
(15% stranieri)



CERN: European Organisation for Nuclear Research (since 1954)

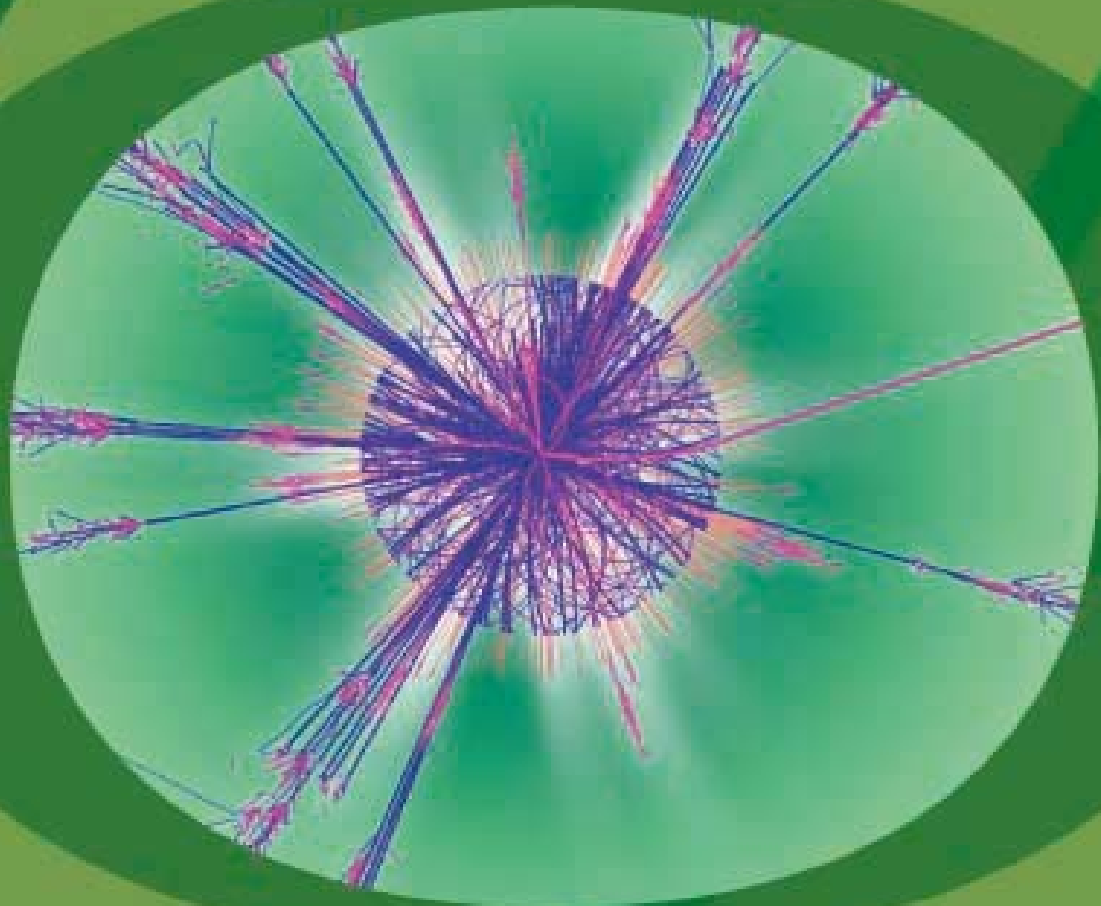
- The world leading HEP laboratory, Geneva (CH)
- 2500 staff, 8000 users
- 3 Nobel prizes
- Invented the web
- Completing the 27 km (6000 M€) LHC accelerator



The CERN Convention (1953) contains what is effectively an early Open Access manifesto:

"… the results of its experimental and theoretical work shall be published or otherwise made generally available"

OA & HEP: a synergy



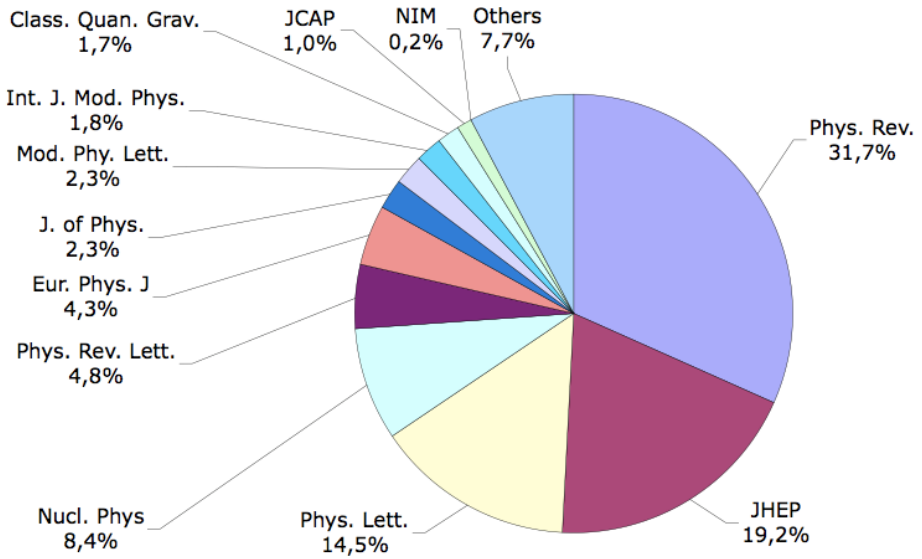
The unique situation of HEP

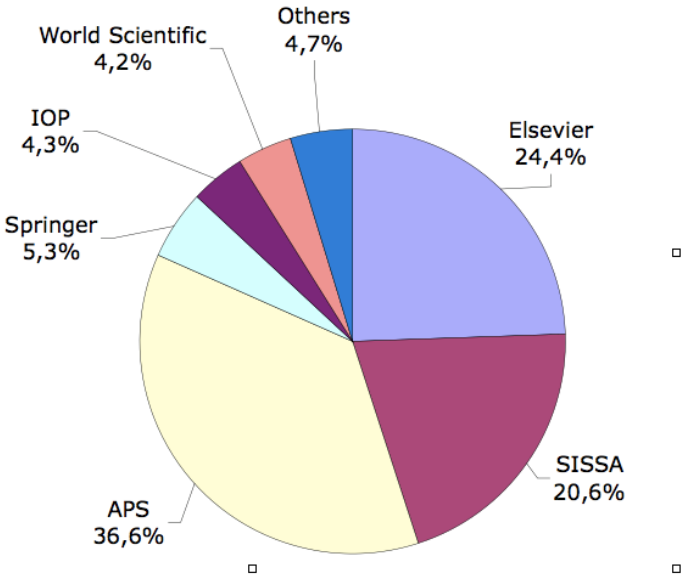
- HEP is decades ahead in thinking Open Access:
  - Mountains of paper preprint shipped all over the world by HEP institutes for 40 years (at author/institute expenses!)
  - HEP launched arXiv (1991), the archetypal Open Archive
  - The first free peer-reviewed electronic journals:
    - *Journal of High Energy Physics* (1997) • *Physical Review Special Topics Accelerators and Beams* (1998) • *New Journal of Physics* (1998)
- Small and connected community (<15000 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

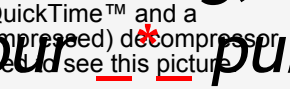
- Journals (with their vaguely anachronistic page and figure limits) are on the way to lose (lost?) a century-old role as vehicle of scholarly communication.
- Still, evaluation of institutes and (young) researchers is based on high-quality peer-reviewed journals.
- The main role of journals is to assure high-quality peer-review and act as keepers-of-the-records
- The HEP community needs high-quality journals
- 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 form 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?
- 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.

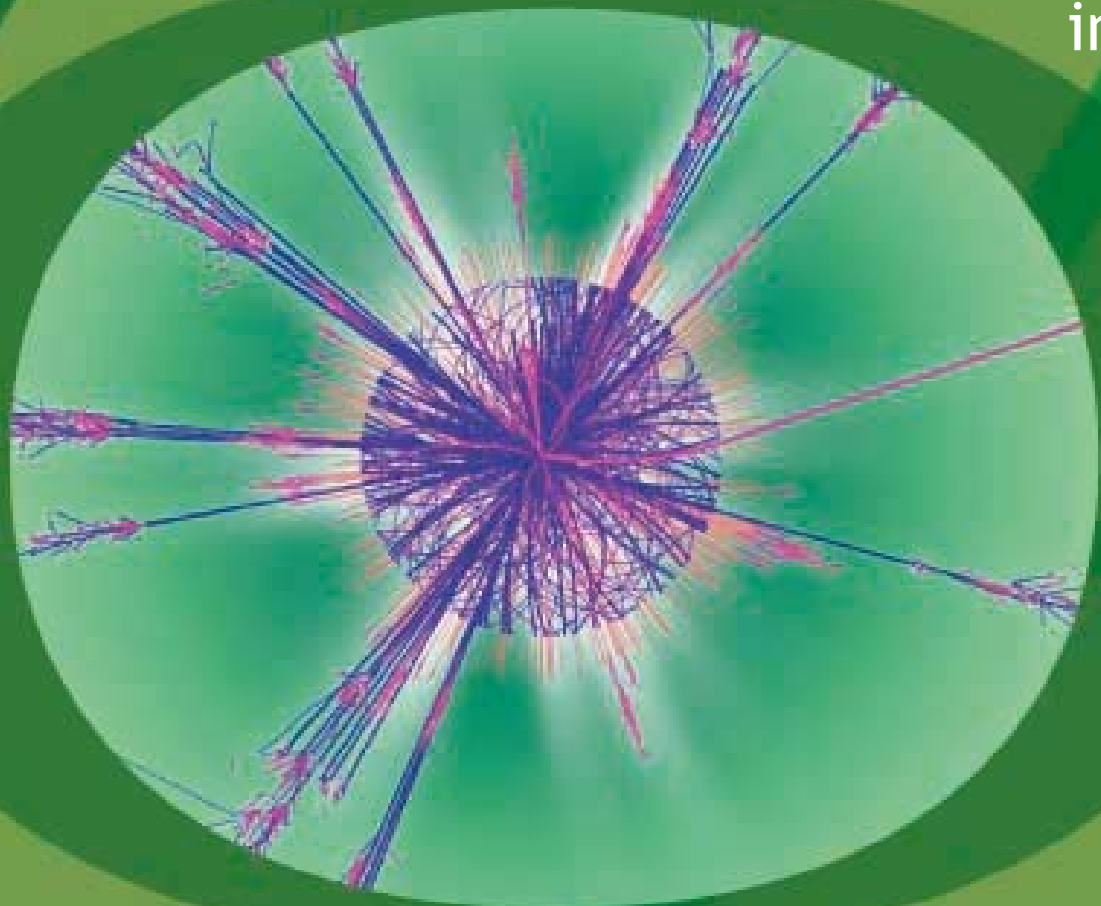
- *Physical Review Special Topics Accelerators and Beams (APS)* since 1998
- "Niche" journal with ~150 article/year and budget ~150'000$/year
- 11 labs worldwide. Longest (only?) success story in HEP OA.
- Is it scalable?

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?

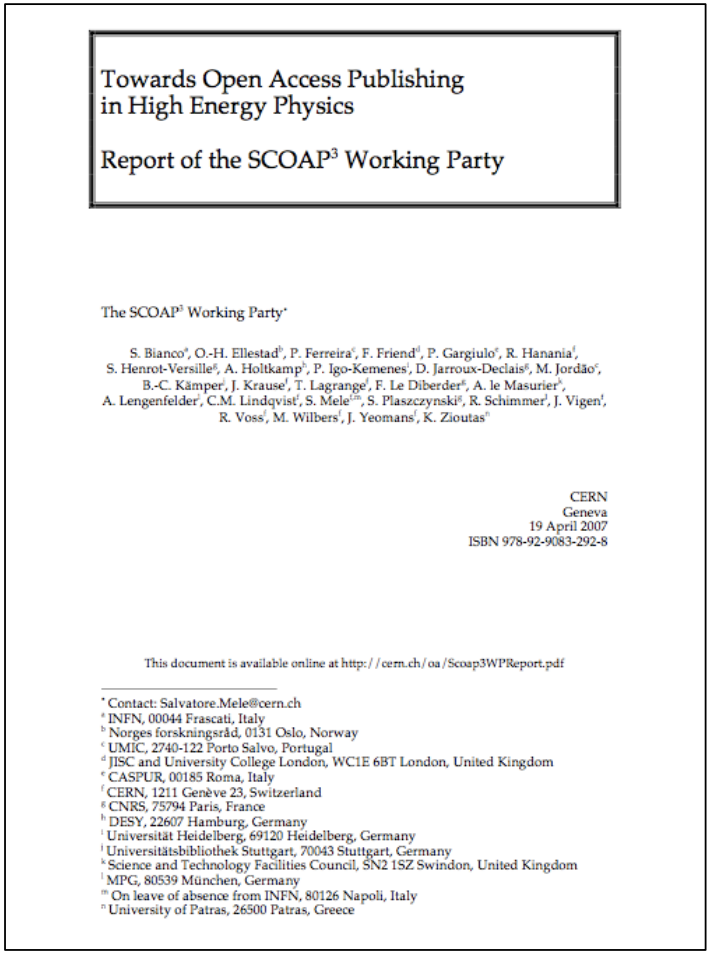
The SCOAP^3 model

Sponsoring Consortium for Open Access Publishing in Particle Physics



Towards the SCOAP^3 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^3 Working Party

The SCOAP^3 Working Party*

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

SCOAP^3 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^3 consortium, which pays centrally for the peer-review service. Articles are free to read for everyone.

A mix of PRSTAB sponsoring and JHEP/JINST institutional membership, on a world-wide scale

Pillars of the SCOAP^3 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^3 database, harvested by others) and receive financial compensation by SCOAP^3 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^3 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^3.

Pillars of the SCOAP^3 model (III)

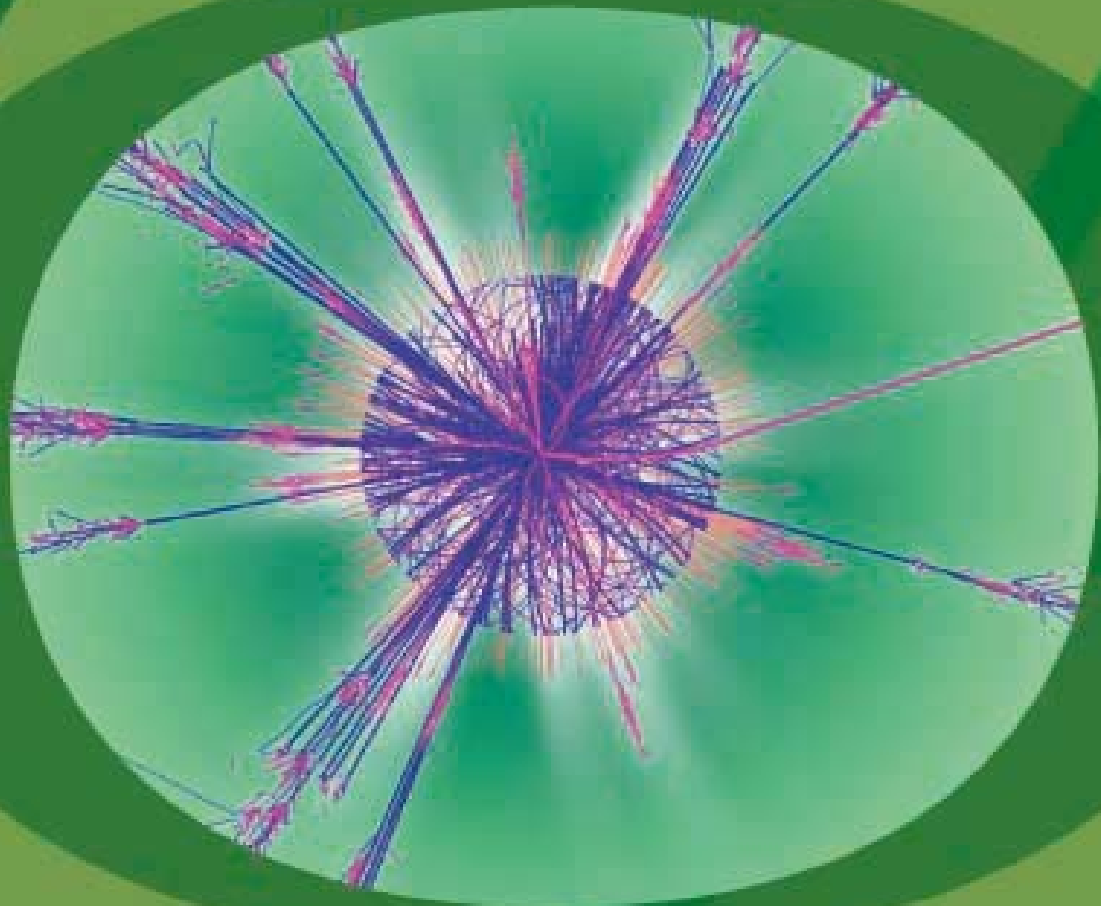
How ?

- 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^3: 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^3 is not limited to this initial set of journals but open to all high-quality HEP journals!

Financial aspects



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

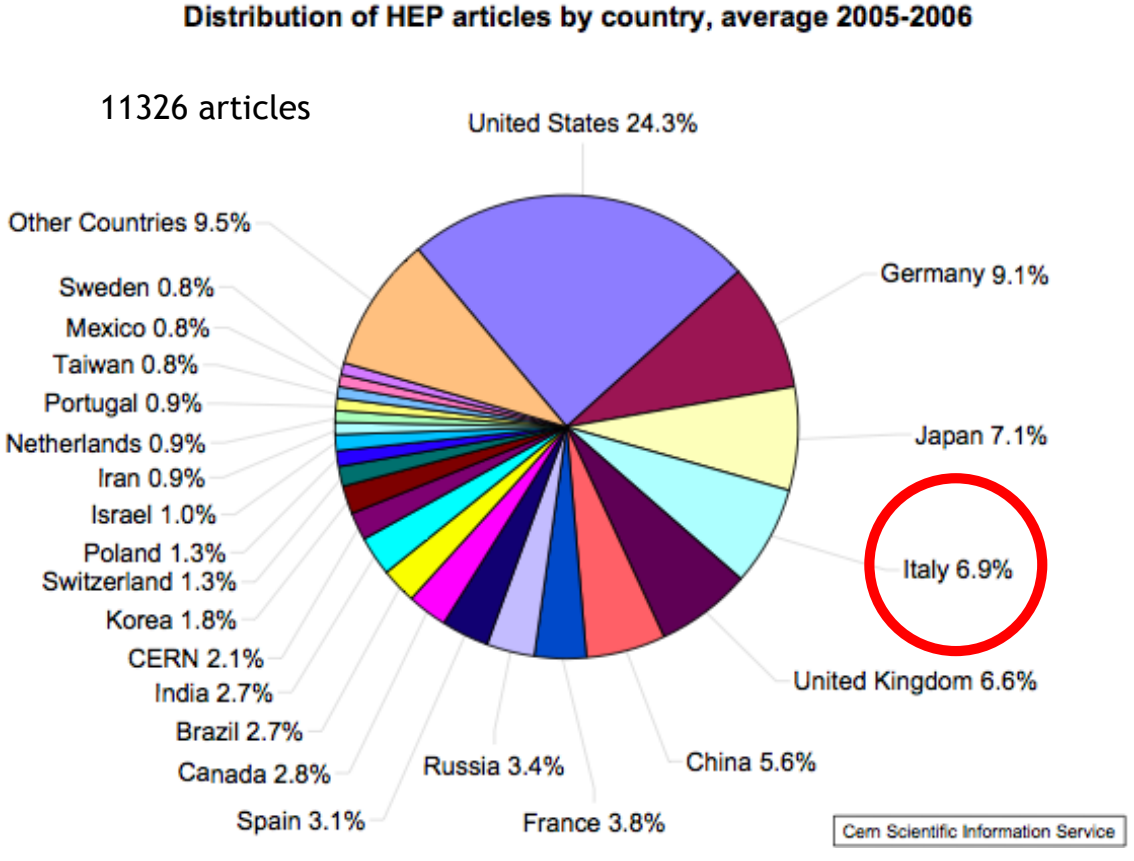
- A published PRD article costs APS ~1500€
- 6-8 leading journals publish 5000-7000 articles a year

SCOAP^3 financing

- SCOAP^3 exact yearly cost to be known after a tender is sent to publishers.
- SCOAP^3 financing to be distributed according to a "fair-share" model based on the distribution of HEP articles per country, accounting for co-authorship.
- Make an 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^3 partners to publish Open Access simply replicates the subscription scheme and does not solve the problems: need to buy/read what others write.

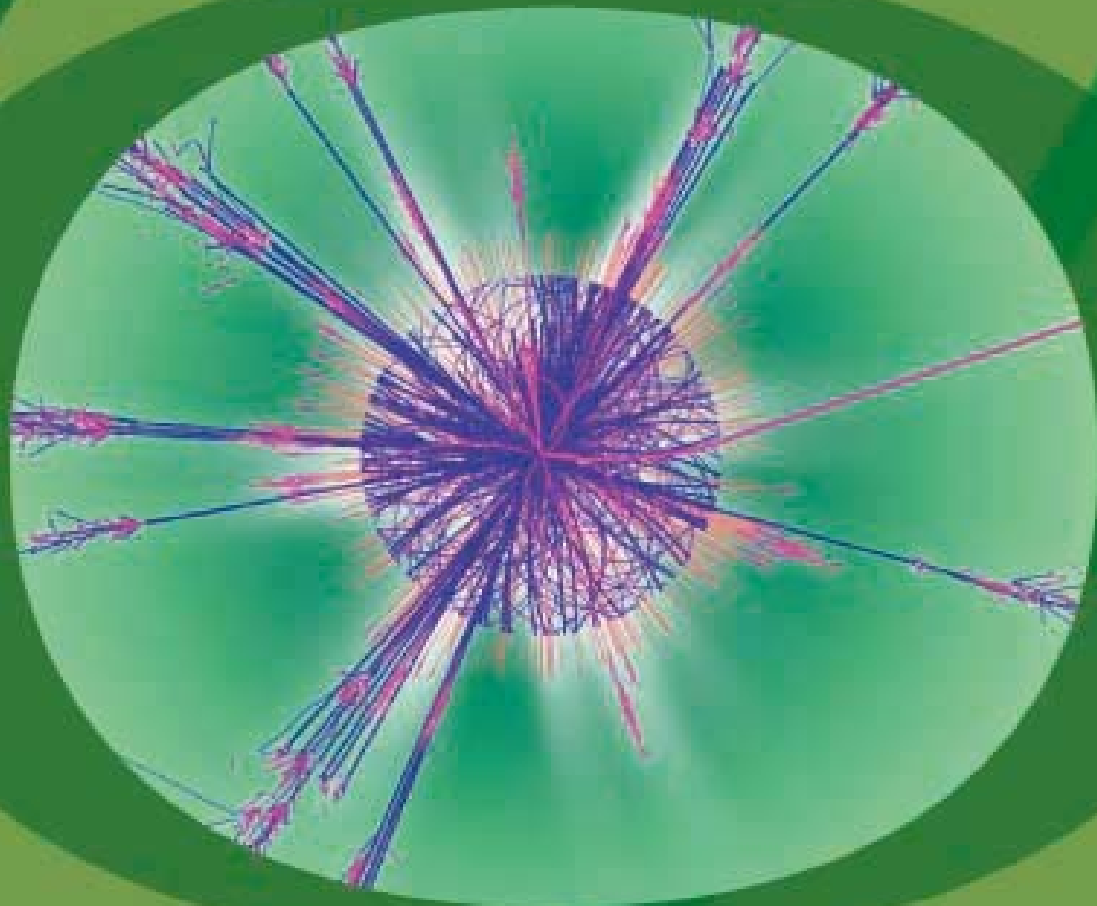
A study of HEP authorship in leading journals

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



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.

Conclusion & outlook



SCOAP^3 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.
- The model has high potential but is only viable if every country contributing to HEP is on board!
- SCOAP^3 model could be rapidly generalized to related fields: Nuclear and Astroparticle Physics.

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^3.
- 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^3.
- Goal: have SCOAP^3 operational for the first LHC articles!


Thank you !
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http://cern.ch/oa/Scoap3WPReport.pdf

OAP in HEP

- una volta partito, SCOAP3 emettera' un bando di gara a tutti i publishers piu` prestigiosi per contrattare un prezzo/articolo
- L'Infn paghera' la quota HEP Italia (~700k□/anno)
- Le sei riviste selezionate saranno OA per tutti
- Nessuno dovra' piu' pagare gli abbonamenti di queste sei riviste
- L'Infn recuperera' la quota versata attraverso i consorzi che applicheranno una quota fair-share alle biblioteche un tempo abbonate alle sei riviste che ora sono Open Access.

Additional material

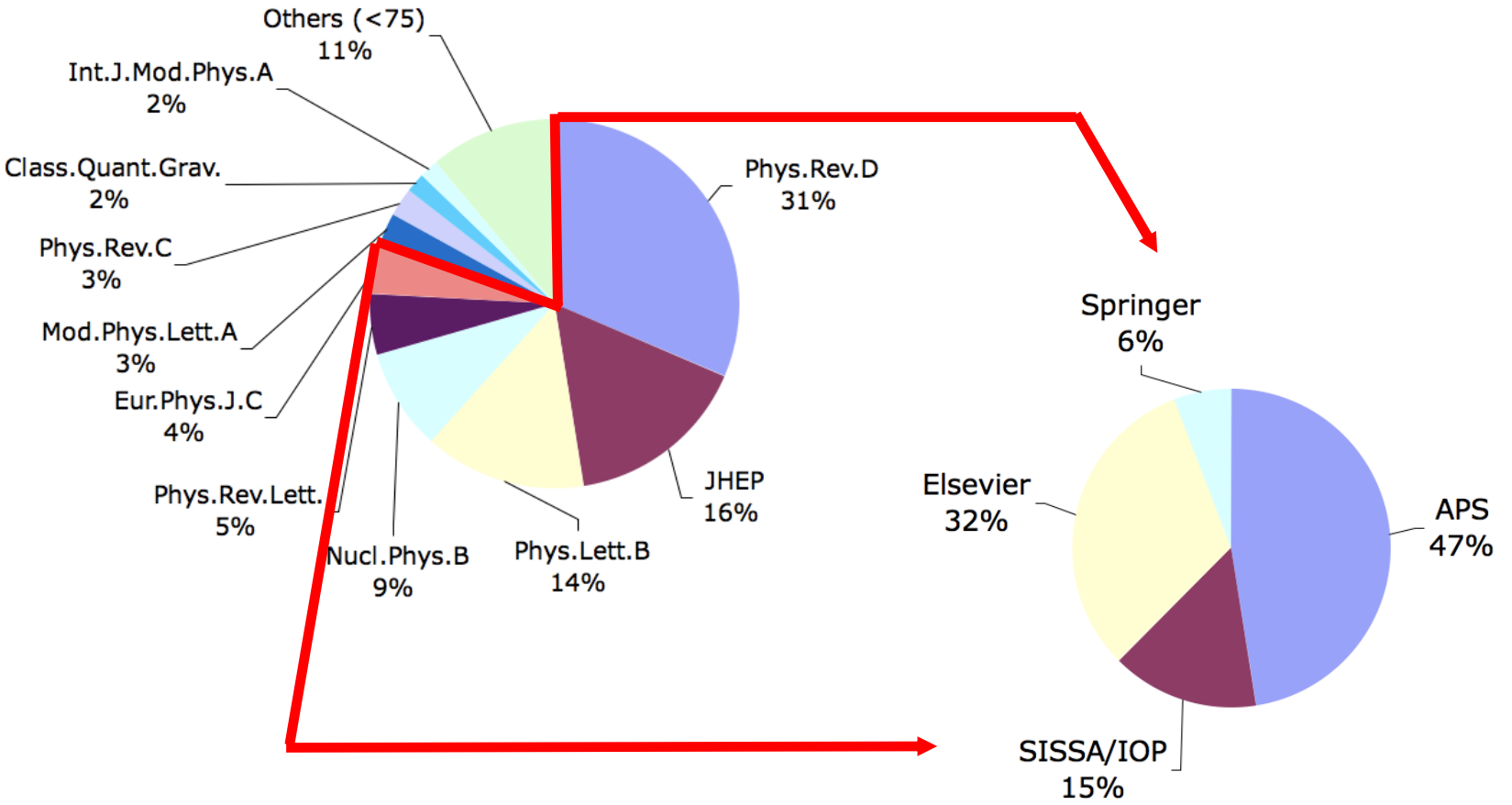
Journals candidate for conversion to OA

As from SPIRES, 8500 HEP articles in 2005: 62% in "core" HEP subjects (experiment, phenomenology, field th.) and 38% in related subject (instrument., nuclear physics, astroparticle, ...)

Journal	Publisher	IF	Articles	HEP Articles	"Core" HEP	f(HEP)	f("Core")
Phys.Rev.D	APS	4,9	2285	2101	1635	72%	92%
JHEP	SISSA/IOP	5,9	856	856	840	98%	100%
Phys.Lett.B	Elsevier	5,3	957	862	740	77%	90%
Nucl.Phys.B	Elsevier	5,5	522	481	465	89%	92%
Phys.Rev.Lett.	APS	7,5	3836	407	279	7%	11%
Eur.Phys.J.C	Springer	3,2	331	272	234	71%	82%
Mod.Phys.Lett.A	World Scient.	1,3	281	216	138	49%	77%
Phys.Rev.C	APS	3,6	853	298	136	16%	35%
Class.Quant.Grav.	IOP	2,9	491	255	89	18%	52%
Int.J.Mod.Phys.A	WSP	1,5	878	143	88	10%	16%
J.Math.Phys.	AIP	1,2	446	108	74	17%	24%
Phys.Atom.Nucl.	Springer	0,9	220	106	72	33%	48%
J.Phys.A	IOP	1,6	850	78	65	8%	9%
Eur.Phys.J.A	Springer	1,7	458	91	58	13%	20%
JCAP	SISSA/IOP	6,7	156	128	57	37%	82%
J.Phys.G	IOP	2,2	414	87	55	13%	21%
Nucl.Instrum.Meth.A	Elsevier	1,2	1371	312	16	1%	23%

80% of articles in "core" HEP subjects in 5-7 journals

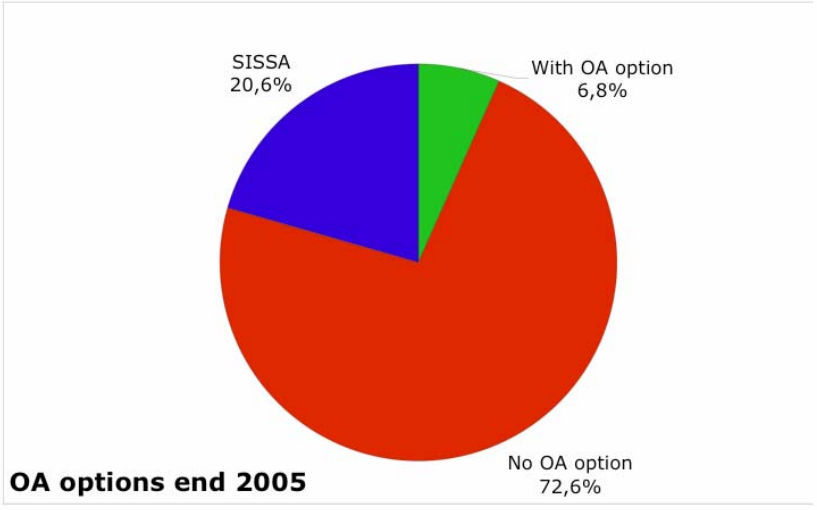
Potential initial partners of SCOAP^3

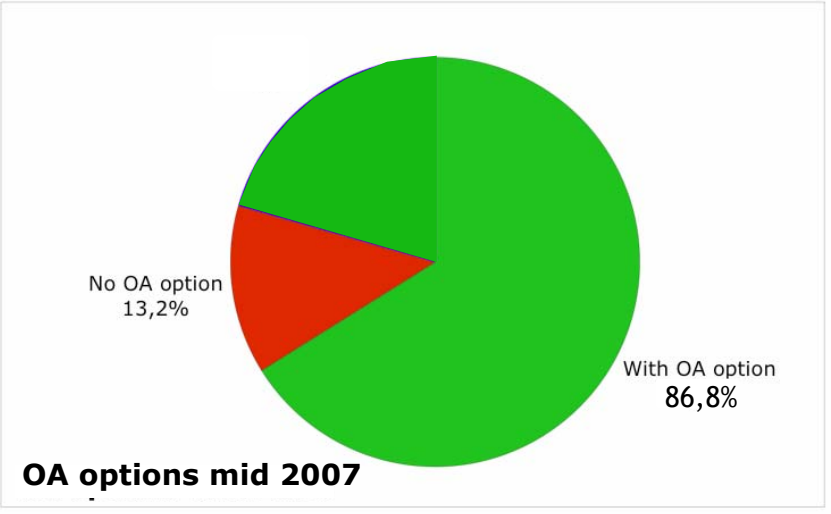


Expansion of OA offers from 2005 to 2007

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.

How are you going to put it together?

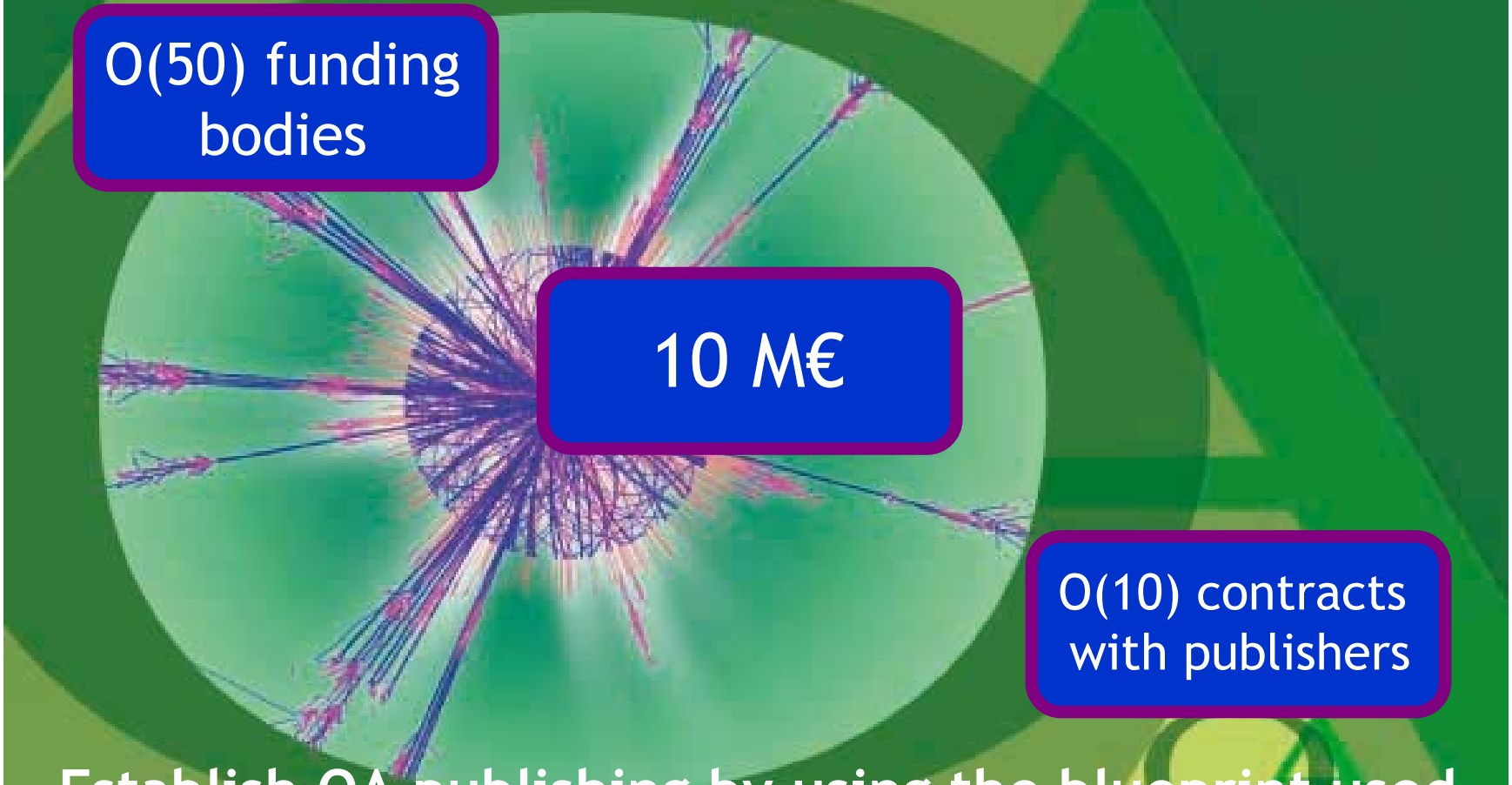
40 funding agencies

400 M€
(Excluding person-power)

1000 contracts

The ATLAS detector is being completed for the LHC!

SCOAP^3 - HEP collaborative experience



O(50) funding bodies

10 M€

O(10) contracts with publishers

Establish OA publishing by using the blueprint used to finance and build the largest experiments ever!