# CERN Open Access Policy

## 60 years of promoting free access to information

Policies combined with technologies

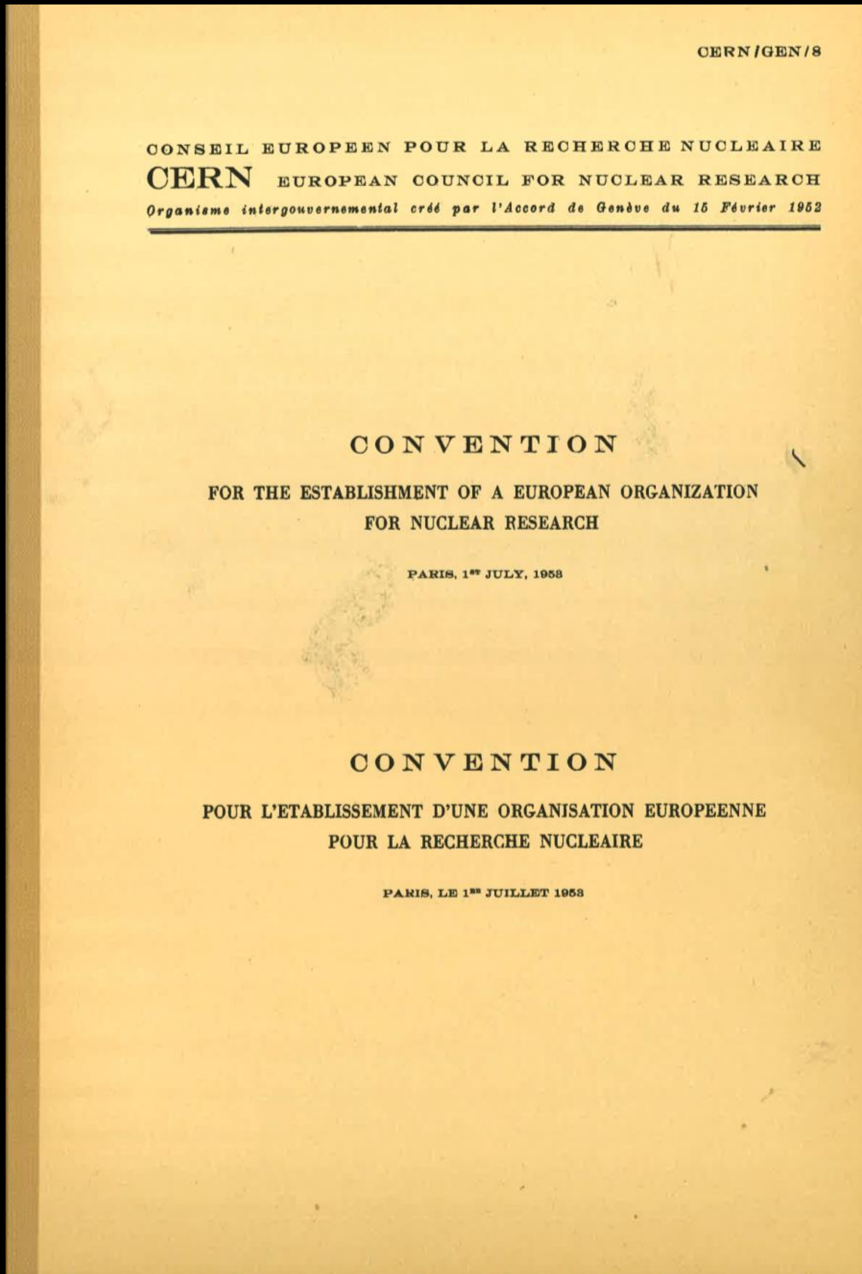
**Visit of Italian librarians@CERN**
**15th April 2015**

Jens Vigen, CERN

# Built on a solid tradition

# … always aiming for innovation

# Policy


CERN/GEN/8

CONSEIL EUROPEEN POUR LA RECHERCHE NUCLEAIRE
CERN EUROPEAN COUNCIL FOR NUCLEAR RESEARCH
*Organisme intergouvernemental créé par l'Accord de Genève du 15 Février 1952*

CONVENTION

FOR THE ESTABLISHMENT OF A EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

PARIS, 1st JULY, 1953

CONVENTION

POUR L'ETABLISSEMENT D'UNE ORGANISATION EUROPEENNE POUR LA RECHERCHE NUCLEAIRE

PARIS, LE 1er JUILLET 1953

CERN Convention (1953), *Ante-litteram* Open Access manifesto:

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

# Technology

CERN 1962: Bureau du courrier au travail

# SIPB chairmen [26/37 = 70% Italian!]

- Brian Montague (ISR)
- Massimiliano Ferro-Luzzi (EP): 1978-1989
- Maurice Jacob (TH): 1989
- John Ellis (TH): 1990-1994
- Walter Blum (EP): 1994-1997
- Gabriele Veneziano (TH): 1997-1998
- Rudiger Voss (EP): 1998-2002
- Guido Altarelli (PH/TH): 2002-2006
- Gigi Rolandi (PH/EP): 2006-

# Scientific Information policies

Here is a list of policies related to the CERN Scientific Information Service:

| | |
|---|---|
| CERN Scientific Information Service mission statement | Mission statement of the Scientific Information Service, as per the guidelines of the Scientific Information Policy Board. |
| CERN Operational Circular N° 3 | This Operational Circular: 'Rules applicable to archival material and archiving at CERN' has been approved in October 1997. Subsidiary document: 'Archiving Policy at CERN' |
| CERN Operational Circular N° 6 | This CERN Operation Circular: 'CERN Scientific Documents' has been approved in June 2001. Additional document: PH publishing policy. |
| CERN Object Preservation Policy | The CERN Object Preservation Policy has been approved in June 2007. |
| Open Access Policy for CERN Publications | The Open Access Policy for CERN Publications has been approved on October, 16th 2014. |

Upgrade to gold with LHC physics

Full gold from 2015!

# All LHC papers are Open Access!

**ALICE** (1,458)

ALICE Papers (109) ALICE Reports (28) ALICE Public Notes (5) ALICE Scientific Notes (1) ALICE Internal Notes (469) ALICE Theses (202) ALICE Photos (352) ALICE Preprints (303) ALICE Internal (7) ALICE Sketches (2) ALICE Slides (0) ALICE Conference Contributions (0) ALICE Conference Proceedings (0)

**ATLAS** (31,776)

ATLAS Papers (417) ATLAS Reports (20) ATLAS Conference Notes (624) ATLAS Notes (6,119) ATLAS Scientific Notes (71) ATLAS Theses (1,104) ATLAS Conference Slides (4,737) ATLAS Videos (508) ATLAS Footage (0) ATLAS Photos (1,990) ATLAS Event Displays (0) ATLAS eNews (250) ATLAS Preprints (2,913) ATLAS Internal (16,086)

**CMS** (8,377)

CMS Papers (430) CMS Reports (17) CMS Conference Reports (2,698) CMS Notes (835) CMS Physics Analysis Summaries (744) CMS Detector Performance Summaries (105) CMS Theses (680) CMS Videos (118) CMS Photos (1,263) CMS Internal (1,487)

**LHCb** (6,833)

LHCb Papers (251) LHCb Reports (24) LHCb Conference Proceedings (618) LHCb Conference Contributions (121) LHCb Public Notes (985) LHCb Detector Performance Papers (14) LHCb Theses (378) LHCb Slides (2,512) LHCb Photos (183) LHCb Miscellaneous (617) LHCb Internal (1,137)

**LHCf** (26)

LHCf Papers (11) LHCf Reports (3) LHCf Conference Proceedings (10) LHCf Notes (0) LHCf Theses (0) LHCf Slides (0) LHCf Photos (2)

**TOTEM** (122)

TOTEM Papers (18) TOTEM Reports (8) TOTEM Conference Proceedings (40) TOTEM Notes (23) TOTEM Theses (24) TOTEM Slides (1) TOTEM Photos (8)

Among these, 1200 articles Open Access in peer-reviewed journals

# Extract from 2014 publishing policy

As of January 2014, CERN and international partners in over 38 countries launched the SCOAP3 initiative, which has converted to Gold Open Access most journals in the field at no cost for any author worldwide. Recently, CERN and the American Physical Society (APS) announced a partnership[1] to publish all CERN articles in APS journals Gold Open Access in 2015 and 2016.

**CERN authors[2] are now requested to publish all their results Gold Open Access.**

While all LHC physics articles are Gold Open Access, only 60% of CERN physics results were published as Gold Open Access in 2013. Thanks to the SCOAP3 initiative and the additional partnership with APS this figure will rise to 90-95% in 2015. CERN now aims to reach 100% Gold Open Access for all its original High-Energy Physics results[3], experimental and theoretical, by the end of 2016.

# Scientific information technologies


One floor below the Library sat a man with thoughts around
“information management”
T. Berners-Lee at CERN, early ’90s

Vague but exciting ...




Tim Berners-Lee, CERN/DD



March 1989

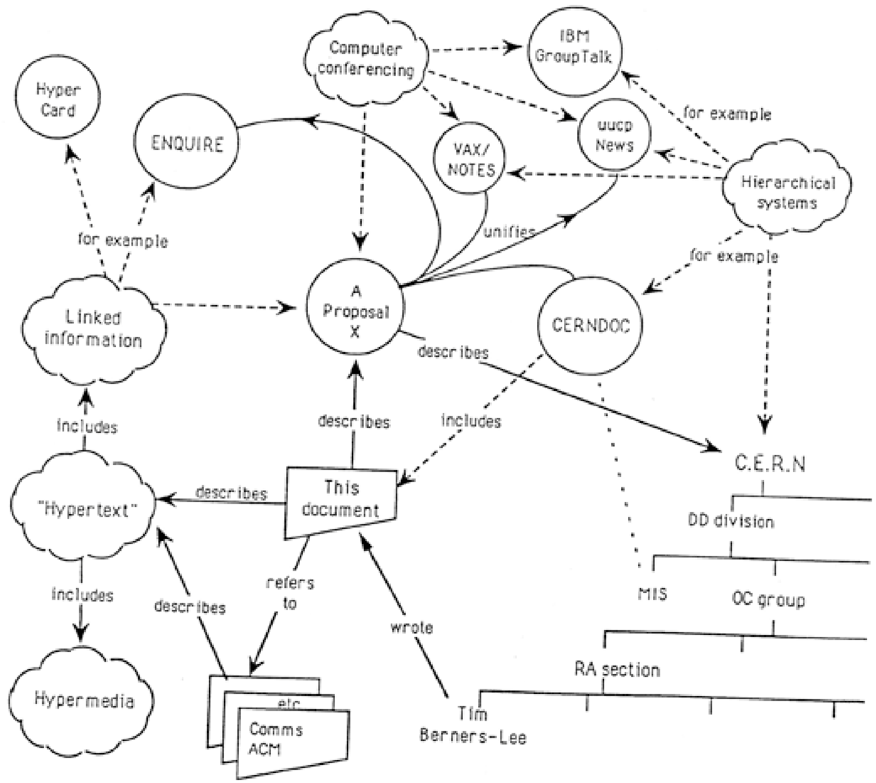

# Information Management: A Proposal


**Abstract**

This proposal concerns the management of general information about accelerators and experiments at CERN. It discusses the problems of loss of information about complex evolving systems and derives a solution based on a distributed hypertext sytstem.

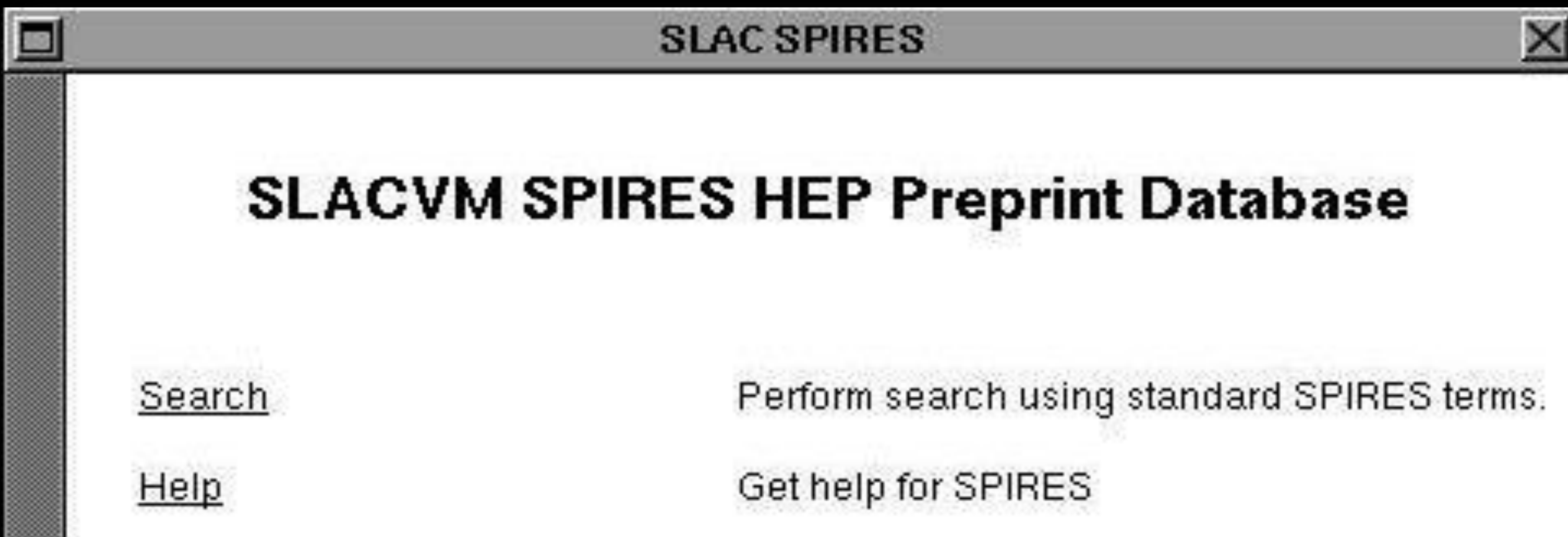


Keywords: Hypertext, Computer conferencing, Document retrieval, Information management, Project control

# What was the first website in the U.S.?

# SPIRES : a library catalogue



# The Web comes to America

On my return from CERN…

- I demonstrate the Web browser to Louise Addis, SLAC librarian, and others by connecting to CERN servers
- Would you like me to start a server connected to the library's SPIRES database, I ask?
- **YES**, by all means
- I give the job to someone else, then forget about it. I was too busy with my more important project. ☺
- Nothing much happens for three months
- prompted by the Louise and Tim, I finished the job
- on Dec. 12, 1991, I sent e-mail to Tim asking him to try out our newly installed Web server

SLAC was the within the first dozen sites in the world and the first outside of Europe to have a Web server

Tim Berners-Lee was very excited abut the SLAC Web server, and used it frequently in public demonstrations

# What happened after that

The SPIRES-Web application at SLAC was the killer app for the Web…

- The SLAC SPIRES database had 200,000 records that physicists really wanted to search; 1000s of users in 40 countries
- Before the Web, it was hard to access and had an awkward command line interface
- The Web interface was easy to use and could be accessed from any computer on the internet
- enthusiasm for the Web within HEP grew enormously, even at CERN, because of SLAC server
- growing use of the Web by HEP was seen by other academic centers such as NCSA where Marc Andressen developed the Mosaic browser

# Not only the web …

## hardware later to be used for accessing digital libraries

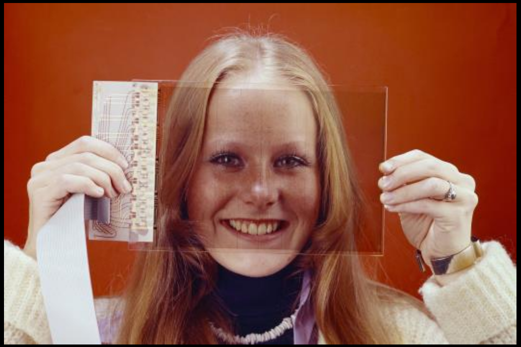
CERN developed a transparent capacitive touch screen in the early 1970s and it was manufactured by CERN and put to use for the consoles of the SPS Control Room in 1973

# Not only the web …

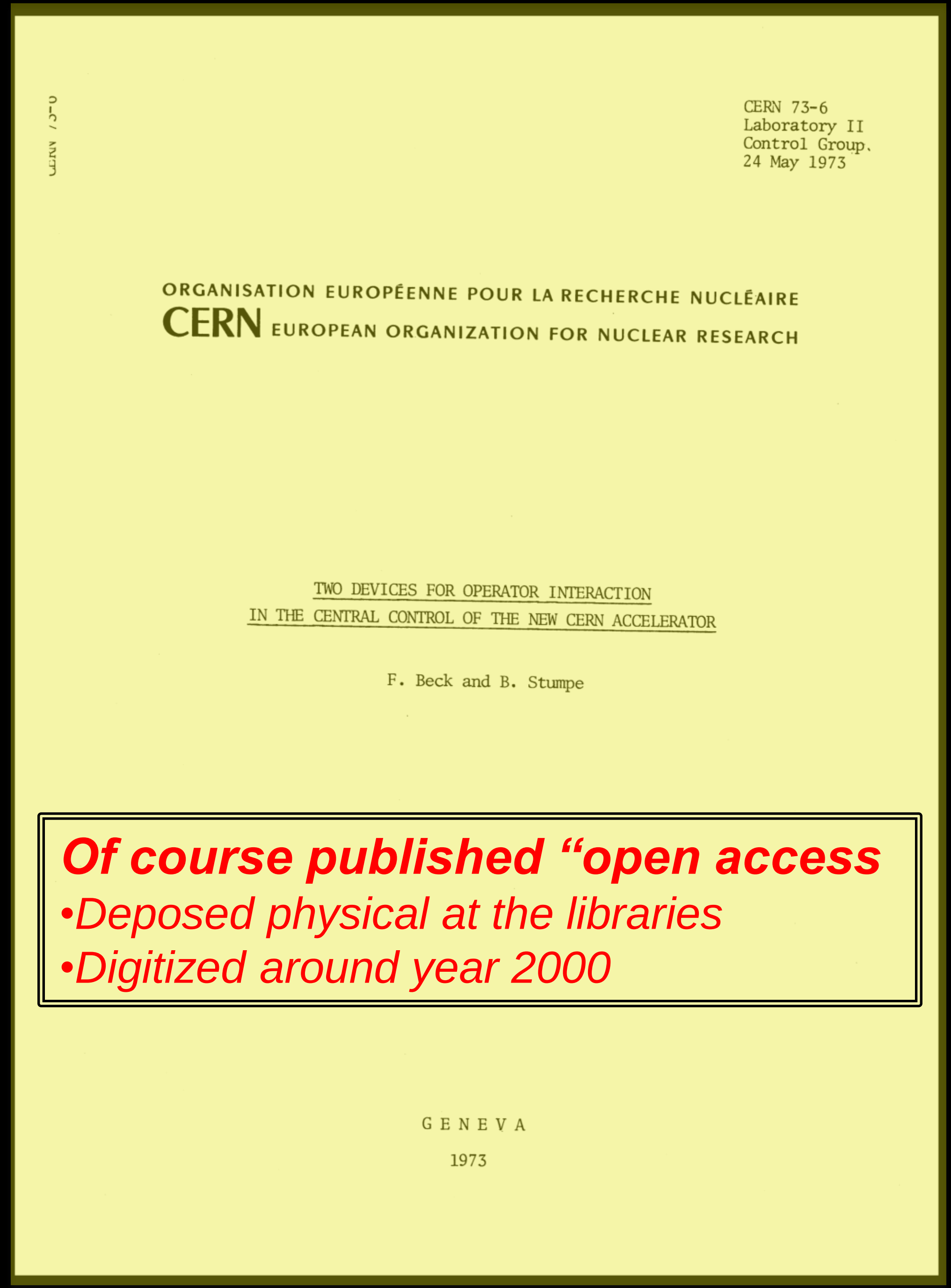
hardware later to be used for accessing digital libraries

CERN developed a transparent capacitive touch screen!

But when do you think this happened?



An early version of the touch screen

CERN 73-6
Laboratory II
Control Group.
24 May 1973

ORGANISATION EUROPÉENNE POUR LA RECHERCHE NUCLÉAIRE
CERN EUROPEAN ORGANIZATION FOR NUCLEAR RESEARCH

TWO DEVICES FOR OPERATOR INTERACTION
IN THE CENTRAL CONTROL OF THE NEW CERN ACCELERATOR

F. Beck and B. Stumpe

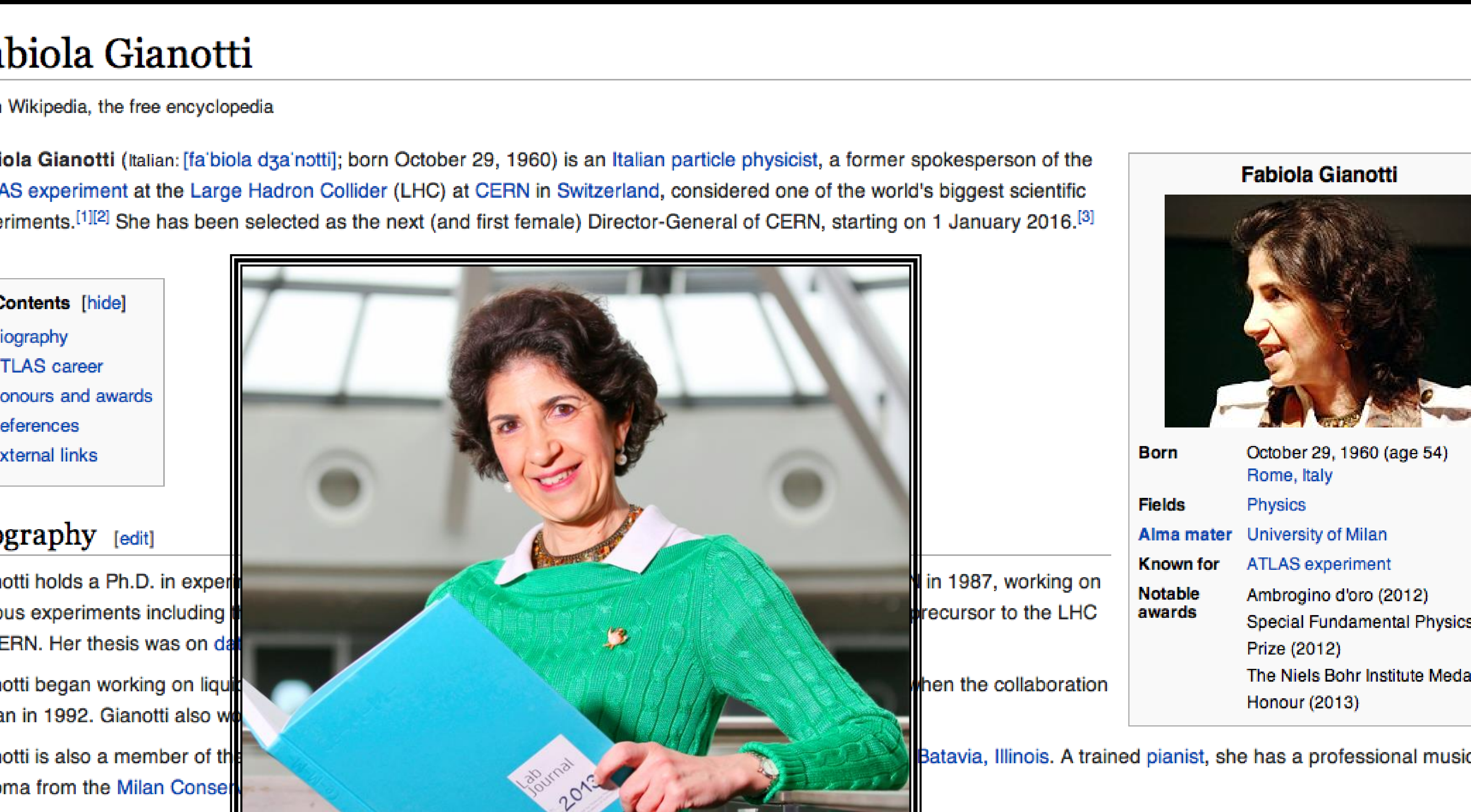
G E N E V A

1973

***Of course published "open access***
- *Deposed physical at the libraries*
- *Digitized around year 2000*

# The CERN history is becoming available online

# Why does not Wikipedia have the best picture?


bbiola Gianotti

n Wikipedia, the free encyclopedia

iola Gianotti (Italian: [faˈbiola dʒaˈnɔtti]; born October 29, 1960) is an Italian particle physicist, a former spokesperson of the AS experiment at the Large Hadron Collider (LHC) at CERN in Switzerland, considered one of the world's biggest scientific eriments.[1][2] She has been selected as the next (and first female) Director-General of CERN, starting on 1 January 2016.[3]

Contents [hide]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TLAS career
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eferences
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ography [edit]

otti holds a Ph.D. in exper … in 1987, working on
ous experiments including … recursor to the LHC
ERN. Her thesis was on da

otti began working on liqu … hen the collaboration
an in 1992. Gianotti also w

otti is also a member of th … Batavia, Illinois. A trained pianist, she has a professional music
oma from the Milan Conser

| Fabiola Gianotti | |
|---|---|
| Born | October 29, 1960 (age 54)<br>Rome, Italy |
| Fields | Physics |
| Alma mater | University of Milan |
| Known for | ATLAS experiment |
| Notable awards | Ambrogino d'oro (2012)<br>Special Fundamental Physics Prize (2012)<br>The Niels Bohr Institute Medal<br>Honour (2013) |

# CERN multimedia is Open Access, but not carry the right license …

- The CERN license is not recognized by Wikipedia and other actors …
- CERN strives to move towards a scheme of generally recognized licenses
- Creative Commons has become mainstream
- LHC exps. publish under CC-BY since 2009
- The Legal Service is now going through a process with the intention to seek the same license conditions for multimedia as for our scientific publications
- Proposal to be submitted to the Management shortly

# BROKEN SYMMETRIES, MASSLESS PARTICLES AND GAUGE FIELDS

P. W. HIGGS
*Tait Institute of Mathematical Physics, University of Edinburgh, Scotland*

Received 27 July 1964

Cited more than 3000 times

Recently a number of people have discussed the Goldstone theorem [1,2]: that any solution of a Lorentz-invariant theory which violates an internal symmetry operation of that theory must contain a massless scalar particle. Klein and Lee [3] showed that this theorem does not necessarily apply in non-relativistic theories and implied that their considerations would apply equally well to Lorentz-invariant field theories. Gilbert [4], however, gave a proof that the failure of the Goldstone theorem in the nonrelativistic case is of a type which cannot exist when Lorentz invariance is imposed on a theory. The purpose of this note is to show that Gilbert's argument fails for an important class of field theories, that in which the conserved currents are coupled to gauge fields.

Following the procedure used by Gilbert [4], let us consider a theory of two hermitian scalar fields

Volume 12, number 2 PHYSICS LETTERS 15 September 1964

KUNGL. VETENSKAPS-AKADEMIEN
THE ROYAL SWEDISH ACADEMY OF SCIENCES

The Royal Swedish Academy of Sciences has decided to award the Nobel Prize in Physics for 2013 to **François Englert** and **Peter W. Higgs** "for the theoretical discovery of a mechanism that contributes to our understanding of the origin of mass of subatomic particles, and which recently was confirmed through the discovery of the predicted fundamental particle, by the ATLAS and CMS experiments at CERN's Large Hadron Collider".

# The Nobel Prize 2013 **in Physics**

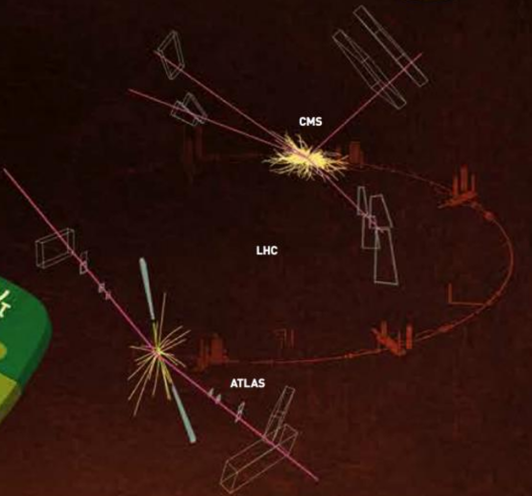
# Here, at last!

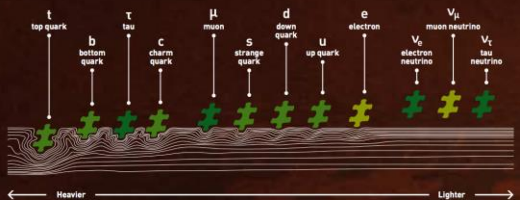
**François Englert and Peter W. Higgs are jointly awarded the Nobel Prize in Physics 2013 for the theory of how particles acquire mass. In 1964, they proposed the theory independently of each other (Englert did so together with his now-deceased colleague Robert Brout). In 2012, their ideas were confirmed by the discovery of a so-called Higgs particle, at the CERN laboratory outside Geneva in Switzerland.**

The awarded mechanism is a central part of the Standard Model of particle physics that describes how the world is constructed. According to the Standard Model, everything – from flowers and people to stars and planets – consists of just a few building blocks: *matter particles* which are governed by forces mediated by *force particles*. And the entire Standard Model also rests on the existence of a special kind of particle: *the Higgs particle*.

The Higgs particle is a vibration of an invisible field that fills up all space. Even when our universe seems empty, this field is there. Had it not been there, nothing of what we know would exist because particles acquire mass only in contact with the Higgs field. Englert and Higgs proposed the existence of the field on purely mathematical grounds, and the only way to discover it was to find the Higgs particle.

The Nobel Laureates probably did not imagine that they would get to see the theory confirmed in their lifetimes. To do so required an enormous effort by physicists from all over the world. Almost half a century after the proposal was made, on July 4, 2012, the theoretical prediction could celebrate its biggest triumph, when the discovery of the Higgs particle was announced.


**ATLAS**
In the collision, a short-lived Higgs particle is created, which decays into two muons (tracks in red) and two electrons (tracks in green).

**CMS**
A short-lived Higgs particle is created in the collision and decays into four muons (tracks in red).

**The Particle Collider LHC**
Protons – hydrogen nuclei – travel at almost the speed of light in opposite directions inside the circular tunnel, 27 kilometres long. The LHC (Large Hadron Collider) is the largest and most complex machine ever constructed by humans. In order to find a trace of the Higgs particle, two huge detectors, ATLAS and CMS, are capable of seeing the protons collide over and over again, 40 million times a second.

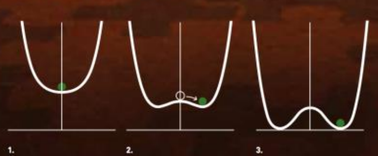
↑

**The Field**
Matter particles acquire mass in contact with the invisible field that fills the whole universe. Particles that are not affected by the Higgs field do not acquire mass, those that interact weakly become light, and those that interact strongly become heavy. For example, electrons acquire mass from the field, and if it suddenly disappeared, all matter would collapse as the suddenly massless electrons dispersed at the speed of light. The weak force carriers, W and Z particles, get their masses directly through the Higgs mechanism, while the origin of the neutrino masses still remains unclear.

→

**Broken Symmetry**
The Higgs mechanism relies on the concept of spontaneous symmetry breaking. Our universe was probably born symmetrical (1), with a zero value for the Higgs field in the lowest energy state – the vacuum. But less than one billionth of a second after the Big Bang, the symmetry was broken spontaneously as the lowest energy state moved away (2) from the symmetrical zero-point. Since then, the value of the Higgs field in the vacuum state has been non-zero (3).

**Potential energy of the Higgs field**




**The Puzzle**
The Higgs particle (H) was the last missing piece in the Standard Model puzzle. But the Standard Model is not the final piece in the cosmic puzzle. One of the reasons for this is that the Standard Model only describes visible matter, accounting for one sixth of all matter in the universe. To find the rest – the mysterious so-called dark matter – is one of the reasons why scientists continue to chase unknown particles at CERN.

← ←

**François Englert**
Belgian citizen. Born 1932 in Etterbeek, Belgium. Professor emeritus at Université Libre de Bruxelles, Brussels, Belgium.

←

**Peter W. Higgs**
British citizen. Born 1929 in Newcastle upon Tyne, United Kingdom. Professor emeritus at University of Edinburgh, United Kingdom.


**FURTHER READING!** More information on the Nobel Prize in Physics 2013: http://kva.se/nobelprizephysics2013 and http://nobelprize.org **REVIEW ARTICLES:** ● **Rose, J.** (2013) *I mörkret bortom Higgs*, Forskning & Framsteg, nr 6 (Swedish). ● **Llewellyn-Smith, C.** (2000) *The Large Hadron Collider*, Scientific American, July. ● **Weinberg, S.** (1999) *A Unified Physics by 2050?*, Scientific American, December.
**BOOKS:** ● **Randall, L.** (2013) *Higgs Discovery: The Power of Empty Space*, Bodley Head. ● **Sample, I.** (2013) *Massive: The Higgs Boson and the Greatest Hunt in Science*, Virgin Books. ● **Carroll, S.** (2012) *The Particle at the End of the Universe*, Dutton. ● **Close, F.** (2011) *The Infinity Puzzle*, Oxford University Press. ● **Wilczek, F.** (2008) *The Lightness of Being: Mass, Ether, and the Unification of Forces*, Basic Books.
**LINKS:** ● **Link TV** (2012) *CERN Scientists Announce Higgs Boson: The Moment*: http://www.youtube.com/watch?v=0CugLD9HF94 ● **CERN** (2010) *CERN LHC Brochure*: http://cds.cern.ch/record/1278169?ln=en ● **Cham, J.** (2012) *The Higgs Boson Explained*. (animation): http://www.phdcomics.com/comics/archive.php?comicid=1489 ● **Higgs, Peter W.** (2010) *My Life as a Boson*. (transcribed speech): http://www.kcl.ac.uk/nms/depts/physics/news/events/MyLifeasaBoson.pdf ● **More references can be found in the Scientific Background:** http: //kva.se/nobelprizephysics2013



**Editors:** Lars Bergström, Lars Brink and Olga Botner, The Nobel Committee for Physics, The Royal Swedish Academy of Sciences; Sara Strandberg and Oscar Stål, Stockholm University; Joanna Rose, Science Writer; Victoria Henriksson, Editor and Linnéa Wallgren, Nobel Assistant, The Royal Swedish Academy of Sciences. **Graphic design:** Ritator **Illustrations:** Johan Jarnestad/ Swedish Graphics **Print:** Åtta45

Printing and distribution made possible by VOLVO

Physics Letters B 716 (2012) 30–61

Contents lists available at SciVerse ScienceDirect

Physics Letters B

www.elsevier.com/locate/physletb

# Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC ☆

32 page article out of a 16 pages author list ☺

CMS Collaboration *

*CERN, Switzerland*

This paper is dedicated to the memory of our colleagues who worked on CMS but have since passed away. In recognition of their many contributions to the achievement of this observation.

ARTICLE INFO

*Article history:*
Received 31 July 2012
Received in revised form 9 August 2012
Accepted 11 August 2012
Available online 18 August 2012
Editor: W.-D. Schlatter

*Keywords:*
CMS
Physics
Higgs

ABSTRACT

Results are presented from searches for the standard model Higgs boson in proton–proton collisions at $\sqrt{s} = 7$ and 8 TeV in the Compact Muon Solenoid experiment at the LHC, using data samples corresponding to integrated luminosities of up to 5.1 $fb^{-1}$ at 7 TeV and 5.3 $fb^{-1}$ at 8 TeV. The search is performed in five decay modes: $\gamma\gamma$, ZZ, $W^+W^-$, $\tau^+\tau^-$, and $b\bar{b}$. An excess of events is observed above the expected background, with a local significance of 5.0 standard deviations, at a mass near 125 GeV, signalling the production of a new particle. The expected significance for a standard model Higgs boson of that mass is 5.8 standard deviations. The excess is most significant in the two decay modes with the best mass resolution, $\gamma\gamma$ and ZZ; a fit to these signals gives a mass of $125.3 \pm 0.4(\text{stat.}) \pm 0.5(\text{syst.})$ GeV. The decay to two photons indicates that the new particle is a boson with spin different from one.



## 1. Introduction

The standard model (SM) of elementary particles provides a remarkably accurate description of results from many accelerator and non-accelerator based experiments. The SM comprises quarks and leptons as the building blocks of matter, and describes their interactions through the exchange of force carriers: the photon for

$m_H$ should be smaller than ~1 TeV, while precision electroweak measurements imply that $m_H < 152$ GeV at 95% confidence level (CL) [14]. Over the past twenty years, direct searches for the Higgs boson have been carried out at the LEP collider, leading to a lower bound of $m_H > 114.4$ GeV at 95% CL [15], and at the Tevatron proton–antiproton collider, excluding the mass range 162–166 GeV at 95% CL [16] and detecting an excess of events, recently reported in [17–19] in the range 120–135 GeV

# SCOAP$^3$ – Sponsoring Consortium for Open Access Publishing in Particle Physics

Sponsoring Consortium for Open Access Publishing in Particle Physics

Home | About SCOAP$^3$ | Who is SCOAP$^3$ | SCOAP$^3$ Journals | SCOAP$^3$ Repository | News | Contact

## Home

Welcome to our new web site!

SCOAP$^3$ will start operation in January 1st 2014. These pages provide background information and news as we start operations.

SCOAP$^3$ is a one-of-its-kind partnership of thousands of libraries and key funding agencies and research centers in two dozen countries. Working with leading publishers, SCOAP$^3$ is converting key journals in the field of High-Energy Physics to Open Access at no cost for authors. SCOAP$^3$ is centrally paying publishers for the costs

Search …

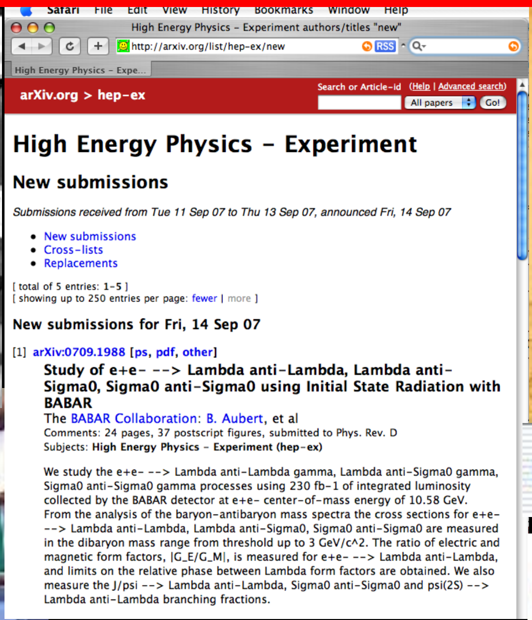
### Recent news

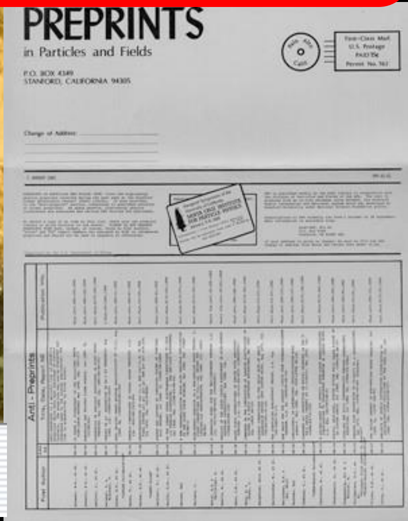
SCOAP$^3$ to start on 1 January 2014 !

SCOAP$^3$, publishers and libraries are finalising subscription reductions

SCOAP$^3$ moves forward.

# HEP has pioneered repositories; still developing
# Time to share with other disciplines and other geographic regions

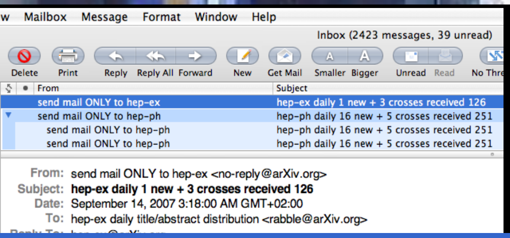


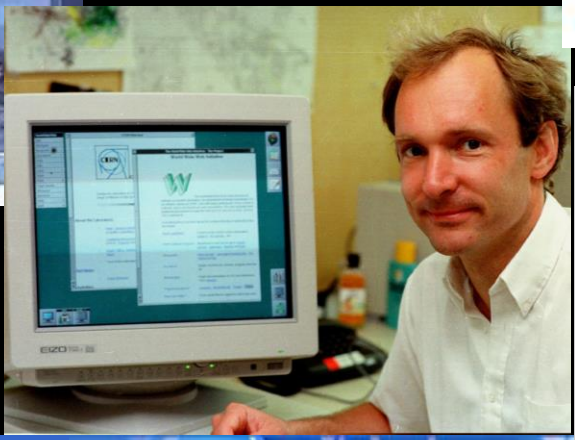




CERN Document Server

SPIRES

arXiv.org



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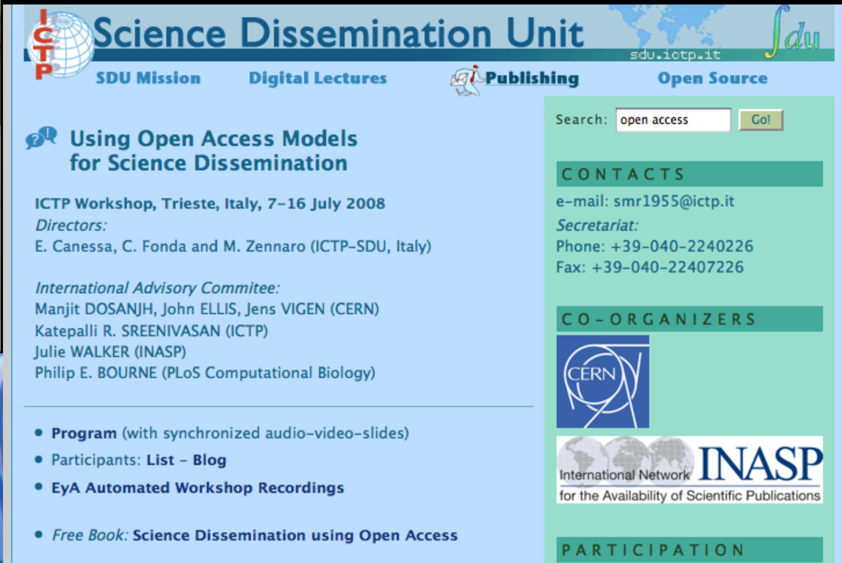


# A successful digital library

- A place “to look and be seen”
- Relevant services on top of good content

- One size does not fit all – get to understand your communities
- It is like building a house; if you are in the tropics you need to provide protection from the sun. It does not help to build a good heating system – even if that is what you are best at …

# Forecasted CERN Open Access articles ratio 2015

- SCOAP, the APS arrangement and having sorted out the instrumentation paper issues will bring us to a 95% OA output for articles
- Deals for instrumentation paper recently concluded:
  - NIMA
  - JINST
  - IEEE

# Proceedings: Current status (2013)

1044 published conference papers with CERN affiliation or experiment

710 in OA series

210 in non-OA journals

124 published in books, book series, conf web sites (partially OA, e.g. Moriond)

~ 70% OA

Including CERN special deals: > 80%

# CERN OA conf papers (2013)

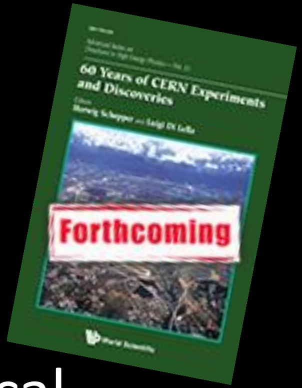
| | |
|---|---|
| 325 | JACoW |
| 176 | PoS |
| 120 | EPJ Web Conf. |
| 50 | CERN YR |
| 38 | J. Phys. Conf. Ser. |

77% of journals/series

including CERN special deals: ~ 90%

# The first commercially published Open Access monographs

- Melting Hadrons, Boiling Quarks - From Hagedorn temperature to ultra-relativistic heavy-ion collisions at CERN
  - Editor: Jan Rafelski
  - To be published by Springer
- 60 Years of CERN Experiments and Discoveries
  - Editors: Schopper and Di Lella
  - To be published by World Scientific




- Technology meets research : 60 years of technological achievements at CERN illustrated with selected highlights
  - Editors: Wenninger et al.
  - To be published by World Scientific
- The Standard Theory of Particle Physics
  - Editors: L. Maiani and L. Rolandi
  - To be published by World Scientific

# What can we do to get to 100% OA?

# What can we do to get to 95 ~~100~~ % OA?

# What can we do to get to 95 ~~100~~ % OA?

# Influence conference committees

However, if we do not strive for 100%,
we will never reach 95%!