Successful transition of High-Energy Physics publications into Gold OA

Review of two years of SCOAP³

01st December 2015
Alexander Kohls, CERN
Nina Karlstrøm, CRISTin
What is SCOAP$^3$?

SCOAP$^3$ is a global partnership which converts high-quality subscription journals in High Energy Physics to Open Access through re-direction of existing subscription funds.
High-Energy Physics: ~7’500 papers/year
90% written by 1 to 5 authors
Only 2% of overall publications from CERN
Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC

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.

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 5.0 fb\(^{-1}\) at 8 TeV. The search is performed in five decay modes: \( \gamma\gamma, ZZ, W^+W^-, \tau^+\tau^-, bb\). An excess of events is observed above the expected background, with a local significance of 3.0 standard deviations at a mass near 125 GeV, signaling the production of a new particle. The expected significance for a standard model Higgs boson of that mass is 3.0 standard deviations. The excess is most significant in the two decay modes with the best mass resolution, \( \gamma\gamma \) and \( ZZ \), at 3.1 and 3.0 standard deviations, respectively. The decay to two photons indicates that the new particle is a boson with spin 0 and is consistent with the SM Higgs boson.

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 electromagnetic interactions, the \( W \) and \( Z \) bosons for weak interactions and the gluons for strong interactions. The electromagnetic and weak interactions are unified in the electroweak theory. Although the predictions of the SM have been extensively confirmed, the question of how the \( W \) and \( Z \) gauge bosons acquire mass whilst the photon remains massless is still open.

Nearly fifty years ago it was proposed [1-6] that spontaneous symmetry breaking in gauge theories could be achieved through the introduction of a scalar field. Applying this mechanism to the electroweak theory [7-9] through a complex scalar doublet field leads to the generation of the \( W \) and \( Z \) masses, and to the prediction of the existence of the SM Higgs boson [10]. The scalar field also gives mass to the fundamental fermions through the Yukawa interaction. The mass \( m_H \) of the SM Higgs boson is not predicted by theory. However, general considerations [10-13] suggest that \( m_H \) should be smaller than \( \sim 1 \) TeV, while precision electroweak measurements imply that \( m_H \sim 125 \) 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 colliders, leading to a lower bound of \( m_H \geq 114.4 \) GeV at 95\% CL [15] and at the Tevatron proton-antiproton collider, excluding the mass range 162-196 GeV at 95\% CL [16] and observing an excess of events, recently reported in [17-19], in the range 120-135 GeV.

The discovery or exclusion of the SM Higgs boson is one of the primary scientific goals of the Large Hadron Collider (LHC) [20]. Previous direct searches at the LHC were based on data from proton-proton collisions corresponding to an integrated luminosity of 5 fb\(^{-1}\) collected at a center-of-mass energy \( \sqrt{s} = 7 \) TeV. The CMS experiment excluded at 95\% CL a range of masses from 127 to 600 GeV [21]. The ATLAS experiment excluded at 95\% CL the ranges 111.8-116.8, 114.4-121.1 and 120.2-541 GeV [22]. Within the remaining allowed mass region, an excess of events near 125 GeV was reported by both experiments. In 2012 the proton-proton centre-of-mass energy was increased to 8 TeV and by the end of June an additional integrated luminosity of more than 5 fb\(^{-1}\) had been recorded by each of these experiments, thereby enhancing significantly the sensitivity of the search for the Higgs boson.

This letter reports the results of a search for the SM Higgs boson using samples collected by the CMS experiment, comparing data recorded at \( \sqrt{s} = 7 \) and 8 TeV. The search is performed in
Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC

The ATLAS Collaboration

A search for the Standard Model Higgs boson in proton-proton collisions with the ATLAS detector at the LHC is presented. The datasets used correspond to integrated luminosities of approximately 4.8 fb⁻¹ at sqrt(s) = 7 TeV in 2011 and 5.8 fb⁻¹ at sqrt(s) = 8 TeV in 2012. Individual searches in the channels H→ZZ(*)⁻→III, H→gamma gamma and H→WW→e nu mu nu in the 8 TeV data are combined with previously published results of searches for H→ZZ(*)⁻→III, WW(*)⁻→bbbar and tau^⁺+tau^⁻ in the 7 TeV data and results from improved analyses of the H→ZZ(*)⁻→III and H→gamma gamma channels in the 7 TeV data. Clear evidence for the production of a neutral boson with a measured mass of 126.0 ± 0.4(stat) ±0.4(syst) GeV is presented. This observation, which has a significance of 5.9 standard deviations, corresponding to a background fluctuation probability of 1.7x10⁻⁵, is compatible with the production and decay of the Standard Model Higgs boson.

Comments: 24 pages plus author list (38 pages total), 12 figures, 7 tables, revised author list, matches version to appear in Physics Letters B

Subjects: High Energy Physics - Experiment (hep-ex)


DOI: 10.1016/j.physletb.2012.08.020

Report number: CERN-TH-2012-218

Cite as: arXiv:1207.7214 [hep-ex]
(or arXiv:1207.7214v2 [hep-ex] for this version)

Submission history

From: Atlas Publications [view email]


Which authors of this paper are endorsers? [ Disable MathJax ] (What is MathJax?)

Link back to: arXiv, form interface, contact.
97% of HEP journals’ content is in arXiv
Dissemination on arXiv.org

Peer-review and publishing services paid through purchase of content
Part of the CERN mission (1953): “[…] sponsoring of international co-operation in nuclear research, including co-operation outside the Laboratories [which] may include in particular […] the dissemination of information”
LHC: largest scientific instrument ever built, 27km
CERN principle of Openness (1953): “the results of its experimental and theoretical work shall be published or otherwise made generally available”
Build a global partnership
…for Open Access in HEP.
Re-use subscription money...
...and liaise with Funding Agencies...
to pay peer-review & publishing services...
and not for content...
...at no cost for authors!
The SCOAP$^3$ Business Model

- No change in behavior
- No burden
- Retains the copyright

Researchers

- Reads and Writes
- Writes
- Reads

Publishers

- Reduction on Subscriptions

Libraries / Consortia

- Support OA policies with existing funds

Funding Agencies

- Support

APC's

Open Access

Icon made by Freepik licensed under CC BY 3.0
Review of two years of SCOAP³

I. Partnership
At start of operation: 15 countries + CERN
47 countries and IGOs today - and still growing…

~3,000 libraries, funding agencies and research institutions
Territory size shows the proportion of all scientific papers published in 2001 written by authors living there http://www.worldmapper.org/display.php?selected=205
II. Publications
<table>
<thead>
<tr>
<th>Publisher</th>
<th>Journal</th>
<th>Articles</th>
</tr>
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<tbody>
<tr>
<td>ELSEVIER</td>
<td>Nuclear Physics B</td>
<td>624</td>
</tr>
<tr>
<td></td>
<td>Physics Letters B</td>
<td>1’700</td>
</tr>
<tr>
<td>Hindawi</td>
<td>Advances in High Energy Physics</td>
<td>316</td>
</tr>
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<td>IOP Publishing</td>
<td>Chinese Physics C</td>
<td>44</td>
</tr>
<tr>
<td></td>
<td>Journal of Cosmology &amp; Astroparticle Physics</td>
<td>418</td>
</tr>
<tr>
<td></td>
<td>New Journal of Physics</td>
<td>17</td>
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<tr>
<td>JAEGEULSAN UNIVERSITY</td>
<td>Acta Physica Polonica B</td>
<td>38</td>
</tr>
<tr>
<td>OXFORD UNIVERSITY PRESS</td>
<td>Progress of Theoretical &amp; Experimental Physics</td>
<td>156</td>
</tr>
<tr>
<td>Springer</td>
<td>European Physical Journal C</td>
<td>1’075</td>
</tr>
<tr>
<td></td>
<td>Journal of High Energy Physics</td>
<td>3’943</td>
</tr>
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Articles as of November 30th 2015: 8,331
<table>
<thead>
<tr>
<th>Publisher</th>
<th>Journal</th>
<th>articles</th>
</tr>
</thead>
<tbody>
<tr>
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<tr>
<td>Warsaw University</td>
<td>Progress of Theoretical &amp; Experimental Physics</td>
<td>156</td>
</tr>
<tr>
<td>OXFORD</td>
<td>European Physical Journal C</td>
<td>1’075</td>
</tr>
<tr>
<td>UNIVERSITY PRESS</td>
<td>Journal of High Energy Physics</td>
<td>3’943</td>
</tr>
</tbody>
</table>

> 50% of HEP

Articles as of November 30th 2015: 8,331
III. Price
| Publisher | Journal                                                   | APC  
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>Elsevier</td>
<td>Nuclear Physics B</td>
<td>$2'000</td>
</tr>
<tr>
<td></td>
<td>Physics Letters B</td>
<td>$1'800</td>
</tr>
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<td>Hindawi</td>
<td>Advances in High Energy Physics</td>
<td>$1'000</td>
</tr>
<tr>
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<td>Chinese Physics C</td>
<td>£1'000</td>
</tr>
<tr>
<td>IOP</td>
<td>Journal of Cosmology &amp; Astroparticle Physics</td>
<td>£1'400</td>
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<td>New Journal of Physics</td>
<td>£1'200</td>
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<tr>
<td>JAGIELLONIAN UNIVERSITY IN KRAKOW</td>
<td>Acta Physica Polonica B</td>
<td>€500</td>
</tr>
<tr>
<td>OUP</td>
<td>Progress of Theoretical and Experimental Physics</td>
<td>£1'000</td>
</tr>
<tr>
<td>Springer</td>
<td>European Physical Journal C</td>
<td>€1'500</td>
</tr>
<tr>
<td></td>
<td>Journal of High Energy Physics</td>
<td>€1'200</td>
</tr>
</tbody>
</table>

**Average effective APC 2014-2015:** €1’105

(SCOAP3 pays maximum = 2011 #articles, rest free)
The SCOAP3 initiative and the Open Access - Article-Processing-Charge market: global partnership and competition improve value in the dissemination of science

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**Impact Factor (2012)**

**Gold Open Access journals**

- AIP
- Frontiers
- PLoS
- Taylor and Francis
- Hindawi
- BioMed Central
- Nature
- The Royal Society
- Wiley
- Elsevier
- Oxford University Press
- SAGE
- Springer

**Hybrid journals**

- AIP
- APS
- BMJ
- IOP
- Oxford University Press
- The Royal Society
- Elsevier (75% contour)
- SCOAP3 journals

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**Average APC 2013-14 paid by the Wellcome Trust:** € 2,282<sup>c</sup>

**Average APC 2015 paid by UK higher education inst:** € 2,188<sup>b</sup>

**Average APC 2014 paid by German universities:** € 1,234<sup>a</sup>

**SCOAP3 average effective APC 2014-2015:** € 1,105

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Sources: Journal Citation Report, publishers' websites, scoap3.org, webarchive.org

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**Investment of fresh money**

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**Chart:** C. Romeu et al. (2014) *The SCOAP3 initiative and the Open Access - Article-Processing-Charge market: global partnership and competition improve value in the dissemination of science* DOI: 10.2314/CERN/C26P.W9DT

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a) https://github.com/OpenAPC/openapc-de;
b) http://figshare.com/articles/2015_Jan_June_UK_APC_data_combined/1509860;
c) http://blog.wellcome.ac.uk/2015/03/03/the-reckoning-an-analysis-of-wellcome-trust-open-access-spend-2013-14/
Review of two years of SCOAP³

IV. Compliance
Article compliance is not a given

The Reckoning: An Analysis of Wellcome Trust Open Access Spend 2013-14

3 MAR, 2015

by Wellcome Trust

tags: Data, Journals, Open Access, Open data, policy, Publishing, Robert Kiley

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### CC-BY and Europe PMC deposit: compliance

<table>
<thead>
<tr>
<th>Basic compliance</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Articles for which an APC has been paid</td>
<td>2556</td>
<td>100%</td>
</tr>
<tr>
<td>Number of these articles available via Europe PMC as full text (as of 1st February 2015)</td>
<td>2221</td>
<td>87%</td>
</tr>
<tr>
<td>Number of these articles NOT available as full text in Europe PMC</td>
<td>335</td>
<td>13%</td>
</tr>
<tr>
<td>Licence compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of articles with a CC-BY (or CC-0) licence</td>
<td>1679</td>
<td>66%</td>
</tr>
<tr>
<td>Number of articles with other licence (or no licence)</td>
<td>877</td>
<td>34%</td>
</tr>
<tr>
<td>Full compliance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total number of papers with full text in Europe PMC, and CC-BY licence</td>
<td>1565</td>
<td>61%</td>
</tr>
</tbody>
</table>

### Analysis of articles not avail. in Europe PMC

<table>
<thead>
<tr>
<th>Analysis</th>
<th>Number</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Total Number of articles not in Europe PMC</td>
<td>335</td>
<td>100%</td>
</tr>
<tr>
<td>Duplicate articles identified in the dataset supplied by Institutions</td>
<td>3</td>
<td>&lt;1%</td>
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<tr>
<td>Total number of articles which could be found (via Google and a DOI/title search) but are not in Europe PMC</td>
<td>325</td>
<td>97%</td>
</tr>
<tr>
<td>Of those 325 papers we could find:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OA on the publisher site</td>
<td>308</td>
<td>95%</td>
</tr>
<tr>
<td>Not OA on the publisher site</td>
<td>17</td>
<td>5%</td>
</tr>
<tr>
<td>Of those 308 papers which are OA on the publisher site: Early View/Ahead of Print</td>
<td>71</td>
<td>23%</td>
</tr>
<tr>
<td>Final published version</td>
<td>237</td>
<td>77%</td>
</tr>
</tbody>
</table>

- 13% of articles not in repository
- Only 66% with CC-BY
- Only 61% fully compliant
- 5% not even OA on publisher site
Central operation guarantees for compliance...

11 Publishers

47 Countries

3'000 Libraries
…via weekly compliance checks!

AUTOMATED VALIDATION

- LICENSE & COPYRIGHT
- DELIVERY FORMAT FOR ARTICLE
- DELIVERY FORMATS FOR METADATA
- OA @ PUBs SITES
- TIMELY DELIVERY (24h)
- ARTICLE RELEVANT (arXiv)
Scenes from a small country

Some thoughts on being a SCOAP³ NCP
### SCOAP³ in Norway

- CRIStin is both the national CRIS and also manages license agreements on behalf of Norwegian research libraries.
- High Energy Physics not a big field in Norway.
- Less research output than comparable countries (e.g. DK, FI).
- CRIStin is the signatory for the MoU.
- Last pull from the SCOAP³ repository showed 184 records with Norwegian affiliation of a total of 8,424 records.
- Working with the SCOAP³ API to pull the articles to CRIStin and disseminate them to the repositories.
- CRIStin pays Norway’s share of SCOAP³.
- Publishers deduct SCOAP³ journal costs from their central invoices to CRIStin.
- CRIStin adds proportional costs to invoices sent to institutions.
Benefits and challenges

- Growing interest in OA
- Still immature market
  
  How will publishing economy develop?
- SCOAP³ one economy model to learn from
- Excellent service from CERN
  
  Their expertise valuable to reuse in other offset deals
- Great to be part of a truly international consortium!
- Good networking to be reused
- Complex model
- Dedication and costs from NCPs
- Truly awful reconciliation model before start-up
- Hard to reach out to the physics community
What distinguishes SCOAP$^3$ from other OA models?

Collaboration between libraries, researchers, funding agencies and publishers

Central and efficient operation

Reuse of available subscription money

OA for established, high-quality journals

No costs and no barriers for scientists
SCOAP$^3$ to continue?

Q1 2015

SWOT analysis to assess the status
- Strong response and engagement from SCOAP$^3$ community
- More than 300 Strengths, Weaknesses, Opportunities & Threats identified

**Strengths**
- International community
- Journals
- Publishers
- Researchers
- Easy access
- APCs
- CERN
- Strong

**Weaknesses**
- Complicated journals
- Librarians
- Institutions
- Costs
- Process
- Subscription

**Opportunities**
- Publishers
- Sustainability
- Business model
- Repositories
- Subscription
- Partners
- Enlargement
- Countries
- Disciplines

**Threats**
- Withdrawal
- Publishers
- Participation
- Journals
- Countries
- Funding
- APCs
- Contribution
- Transition
- Quality
- Process
- Budget
<table>
<thead>
<tr>
<th>Event</th>
<th>Description</th>
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</thead>
<tbody>
<tr>
<td>Q1 2015</td>
<td>SWOT analysis by the SCOAP³ Partnership</td>
</tr>
<tr>
<td>June 2015</td>
<td>SCOAP³ governance agrees with extension to 2017-2019</td>
</tr>
<tr>
<td>Ongoing</td>
<td>Preparation of the continuation of SCOAP³ initially with currently participating parties</td>
</tr>
</tbody>
</table>
Thank you!

http://scoap3.org

alexander.kohls@cern.ch
info@scoap3.org