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Annex 8 to the Memorandum of Understanding for the establishment and operation of SCOAP^3

SCOAP^3 Working Party Report

Towards Open Access Publishing in High Energy Physics

Report of the SCOAP^3 Working Party

The SCOAP^3 Working Party*

[redacted]

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A word from the Chair

Dear Reader

This Report concerns the implementation of a process initiated by CERN's Director-General, [redacted], today supported by leading actors from the particle physics community, and worked through in detail by members of an international Working Party. The initiative offers an opportunity for the cost-effective dissemination of high-quality research articles in particle physics, enabling use of the new technologies of e-Science across the literature of High Energy physics.

The particle physics community has led the academic world in disseminating pre-prints of research articles through large repositories. This Working Party Report offers a new opportunity for the community to add open access peer-reviewed journals to its publishing outlets through a global conversion of the main corpus of journals to the open access model. The opportunity to improve cost-effective access to peer-reviewed research is there for authors, funding agencies and publishers who respond imaginatively to the proposal.

The Working Party has done its work. It is now in the hands of the different stakeholders to use the opportunity opened up in this Report.

Hopefully the model proposed by the Working Party will inspire other disciplines to start work on the conversion of their literature to open access. However, this model can only act as an example and each subject community will have to make their own analysis and decisions to suit their publishing environment.

It has been a privilege for me to chair the Working Party and to witness the vision and the dedication to detail of its members.

[redacted] London, 14th April 2007

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Synopsis

Background

The goal of "Open Access"[1] (OA) is to grant anyone, anywhere and anytime, free access to the results of scientific research. The OA debate has gained considerable momentum in recent years. It is driven mostly by two factors:

- The "serials crisis" of ever-rising costs of journals, which has forced libraries to cancel a steadily-increasing number of subscriptions, curtailing the access of researchers to important scientific literature.
- The increasing awareness that results of publicly-funded research should be made generally available. This need is amplified by the transformation of research activities towards "e-Science", carried out by a global scientific community linked by strong networks.

High Energy Physics (HEP) pioneered OA through "repositories" containing collections of "pre-prints" freely accessible on the Internet. Today about 90% of HEP pre-prints are available in repositories. Thanks to the speed with which they make results available, repositories have become the lifeblood of HEP scientific information exchange. However, repositories do not perform peer review and may contain only the original versions of articles *submitted* to journals, and not necessarily the final, peer-reviewed, *published* versions.

Notwithstanding the success of repositories, there is consensus in the scientific community about the need for high-quality journals that will continue to provide:

- quality control through the peer review process;
- a platform for the evaluation and career evolution of scientists;
- a measure of the quality and productivity of research groups and institutes.

The price of an electronic journal is mainly driven by the costs of running the peer-review system and editorial processing. Most publishers quote a price in the range of 1'000–2'000 Euros per published article. On this basis we estimate that the annual budget for the transition of HEP publishing to OA would amount to a maximum of 10 Million Euros per year. In comparison, the annual list-price of a single "core" HEP journal today can be as high as 10'000 Euros; for 500 institutes worldwide actively involved in HEP, this represents an annual expenditure of 5 Million Euros.

[1] http://oa.mpg.de/openaccess-berlin/berlindeclaration.html

The SCOAP³ model

The proposed initiative aims to convert high-quality HEP journals to OA, pursuing two goals:

- to provide open and unrestricted access to all HEP research literature in its final, peer-reviewed form;
- to contain the overall cost of journal publishing by increasing competition while assuring sustainability.

In the present proposal, the publishers' subscription income from multiple institutions is replaced by income from a single financial partner, the "Sponsoring Consortium for Open Access Publishing in Particle Physics" (SCOAP³). SCOAP³ is a global network of funding agencies, research laboratories, and libraries. Each SCOAP³ partner will recover its contribution from the cancellation of its current journal subscriptions. This model avoids the obvious disadvantage of OA models in which authors are directly charged for the OA publication of their articles.

The financing and governance of SCOAP³ will follow as much as possible the example of large research collaborations and each country will contribute according to the number of its scientific publications. To cover publications from scientists from countries with no funding of HEP research, an allowance of not more than 10% of the SCOAP³ budget is foreseen.

In practice, the OA transition will be facilitated by the fact that the large majority of HEP articles are published in just six peer-reviewed journals from four publishers[2]. Five of those six journals carry a majority of HEP content. These are *Physical Review D* (published by the American Physical Society), *Physics Letters B* and *Nuclear Physics B* (Elsevier), *Journal of High Energy Physics* (SISSA/IOP) and the *European Physical Journal C* (Springer). The aim of the SCOAP³ model is to assist publishers to convert these "core" HEP journals entirely to OA and it is expected that the vast majority of the SCOAP³ budget will be spent to achieve this target. The sixth journal, *Physical Review Letters* (American Physical Society), is a "broadband" journal that carries only a small fraction (10%) of HEP content; it is the aim of SCOAP³ to sponsor the conversion to OA of this journal fraction. The same approach can be extended to another "broadband" journal popular with HEP instrumentation articles: *Nuclear Instruments and Methods in Physics Research A* (Elsevier) with about 25% HEP content.

[2] S. Mele *et al.*, JHEP 12(2006)S01; arXiv:cs.DL/0611130.

HEP has a natural overlap with related fields such as, but not limited to, astro-particle physics and nuclear physics. The five "core" journals include between 10% and 30% of articles in these disciplines, which will be naturally and logically included in the OA transition. This is in the interest of the readership and promotes the long-term goal of an extension of the SCOAP³ model to these related disciplines. The fractions of "broadband" journals quoted above also include publications in these related disciplines.

Of course, the SCOAP³ model is open to any other, present or future, high-quality journals carrying HEP content. This will ensure a dynamic market with healthy competition and a broader choice.

The annual budget for the SCOAP³ operation will be established through a tendering procedure. The tender and the subsequent contracts with publishers will address the use of OA articles, the conditions for un-bundling OA journals from existing subscription packages, and the reduction of subscription prices for "broadband" journals following the conversion of a fraction of articles to OA.

Provided that the SCOAP³ funding partners are ready to engage in long-term commitments, many publishers are expected to be ready to enter into negotiations along the lines proposed here. The SCOAP³ model could be implemented during 2007. Once leading funding agencies will pledge funds for the financial backing of the consortium, the tendering procedure could take place during summer and the exact budget envelope could be known by autumn. A Memorandum of Understanding for the governance of SCOAP³ and the cost sharing could then be signed by the funding agencies; this will be followed by the establishment of contracts with publishers. OA publishing in HEP could then become reality as of the beginning of 2008.

The example of SCOAP³ will be an important milestone in the history of scientific publishing. It could rapidly be followed by other disciplines and, in particular, by fields related to HEP such as nuclear physics or astro-particle physics.

1. Introduction

Access to past and current research reports is of vital importance for current and future research. A key factor in the efficiency of the research process is therefore easy and affordable access to the work of other individuals and groups working in the same area. The Open Access (OA) paradigm aims to thus empower researchers by granting anyone, anywhere and anytime, free access to the results of scientific research, in general through free availability of the electronic versions of scientific publications on the Internet.

For many academic communities, easy and affordable access to journal articles has been put at risk by the lack of price-related competition in the journals industry. The steady increase of journal prices, far above general inflation rates, has forced libraries to cancel subscriptions for journals their readers need, curtailing the access of researchers to parts of the scientific literature. In some cases universities worldwide have even reached the paradoxical extreme of being no longer able to afford the journals where their scientists publish their own work. This "serials crisis" has now reached a level that is damaging the interests of the scientific communities of readers and authors as well as those of some publishers. Although the current publishing scenario still appears stable, the very existence of some key titles is at stake at a time when the quantity of research output is expected to grow[3]. A change in the publishing model along the lines proposed in this Report would provide authors with high-quality publishing outlets at prices sustainable both for research funding agencies and for publishers.

Greater value can be achieved not only from the price-related competition the proposal in this Report will introduce into the physics publishing market, but even more from the OA paradigm itself, which will enable greater use of research results, stimulating further research built upon access to high-quality, peer-reviewed, freely available research reports. In addition, the OA model will free up text and data currently locked away in subscription journals for text- and data-mining applications.

For successful publishers, the proposal in this Report offers opportunities to attract the best authors and achieve higher impact factors. The OA model can bring the benefits of higher citations to all stakeholders in research communication, enabling

[3] European Commission study on the technical and economic evolution of the scientific publication market; http://ec.europa.eu/research/science-society/pdf/scientific-publication-study_en.pdf

funding agencies to gain greater exposure for the research they fund and authors to achieve a higher profile.

High Energy Physics (HEP) and related fields have for a long time pioneered the OA principles through the so-called "repositories", collections of "pre-prints" freely accessible on the Internet. Notable examples are arXiv.org, initiated at Los Alamos and now at Cornell; the SPIRES database, born at Stanford and now numbering many contributors among which DESY in Hamburg; and the CERN Document Server. The fact that today about 90% of HEP pre-prints are available in repositories might make it easier for libraries to cancel expensive journal subscriptions in the field of HEP than in other branches of sciences.

The role of these repositories is to provide access to research articles before publication in peer-reviewed journals, and therefore to enable new results to influence current research at the earliest possible date, speed of availability being an important factor in HEP. Hence, repositories have become the lifeblood of scientific information exchange in HEP. However, repositories do not perform peer-review. They typically contain articles in a preliminary format, *i.e.* the original version *submitted* to a journal, and not necessarily also the final, peer-reviewed *published* version. Furthermore, repositories also contain conference reports, theses, notes and other material, including articles that were never published in refereed journals, either because they were not submitted or because they were rejected. Repositories have thus blurred the traditional boundary between unpublished and peer-reviewed, published literature.

Notwithstanding the success of repositories, there is a consensus in the scientific community that refereed journals will continue to fulfil important functions in future:

- to guide researchers to the most important publications in their field through the editorial scope of journals and their – perceived or established – importance and prestige;
- to provide quality control through peer review;
- to provide a platform for the evaluation and career evolution of scientists – most importantly, young scientists – for which publications in refereed journals will remain an important criterion;
- to provide a measure of the quality and productivity of research groups and institutes, often used as an important criterion in decisions about future funding.

All these are important *raisons d'être* for journals, which repositories cannot fulfil in their present form.

The motivation for the initiative described in this Report is to produce greater value from the investment funding agencies make in supporting peer-reviewed publication of scientific results in high-quality journals. This initiative aims to maintain both the quality of journal publication and a choice for authors among publication outlets, while introducing an element of competition into the service provided by journals, linking price to value.

The HEP community has effectively spearheaded OA, first with its 50-year old "pre-print culture", then with the spread of repositories in the last 15 years. It is now ready for a transition to OA publishing. Its relatively small size and its nearly complete overlap between the reader and author communities[4] can be of great advantage in this pioneering process.

An appropriate model to achieve this transition of HEP publishing to OA, while maintaining quality and adding greater value, was set out by the Task Force on Open Access Publishing in Particle Physics. This tripartite task force, which comprised representatives from the author communities, from research agencies and from publishers, operated between late 2005 and early 2006. In its Report[5], published in June 2006, the task force proposed to establish a Sponsoring Consortium for Publishing in Particle Physics (SCOAP³), a central body which would remunerate publishers for the peer-review service, effectively replacing the "reader-pays"model of traditional subscriptions with an "author-side" funding.
Following the task force Report and the acceptance of its model by representatives from major European stakeholders, a Working Party was established to develop a specific proposal for the creation of SCOAP³, which is described in this Report.

Section 2 describes the SCOAP³ model and the roles of publishers, funding agencies and libraries in the OA publishing scheme, as well as the benefits for the scientific community.

In Section 3 the HEP publication landscape is analyzed and an initial set of five "core" HEP journals is spotlighted as candidates to be entirely converted to OA. The section also treats the case of articles relevant to HEP but dispersed in several

[4] This situation is typical of many fields of science, opposite to the very different sizes of the author and reader communities *e.g.* in the medical and law publishing markets.
[5] R. Voss *et al.*, *Report of the Task Force on Open Access Publishing in Particle Physics*, CERN; http://library.cern.ch/OATaskForce_public.pdf

"broadband" journals, some of which are to be converted to OA on an article-by-article basis.

Section 4 discusses an estimation of the SCOAP³ budget envelope and presents a "fair-share" scenario for the financing of SCOAP³ by the countries with an active HEP community. The sharing of costs is based on the affiliations of individual authors contributing to the "core" HEP journals and to selected HEP articles in "broadband" journals.

Section 5 discusses the requirements that will form the basis of a tender to be submitted by SCOAP³ to publishers. These requirements and the subsequent contractual agreements will concern the journal infrastructure, quality and policy of the journal, along with some technical and financial aspects. The section also spells out the intended use of the articles, under OA tenets, by the author and reader communities.

A possible timeline of the actions on the road towards the full conversion of HEP publishing to OA is outlined in Section 6.

After two technical annexes, this Report is concluded by a glossary of technical terms and a list of recent public statements in favour of OA publishing from within the HEP community.

2. The SCOAP³ model

The role of SCOAP³

The SCOAP³ consortium will act as a unique interface between the main stakeholders of the HEP scientific information market: on one side the author and reader communities, which have a large overlap, mostly represented by the same funding agencies and served by the same libraries; on the other side the publishers of high-quality HEP journals. The aim of SCOAP³ is to establish OA to HEP peer-reviewed articles along the lines of the Budapest Initiative[6], namely *"[The] free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software,*

[6] http://www.soros.org/openaccess/read.shtml

or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself".

At the time of writing, SCOAP³ is an initiative emanating from:

- several European funding agencies, among which CNRS and CEA (France), INFN (Italy), MPG (Germany) and other funding bodies from Greece, Portugal, Norway, Sweden and Switzerland;
- the two largest European particle physics laboratories, CERN and DESY;
- national and international library and other consortia such as GASCO (Germany, Austria, Switzerland), INFER (Italy), COUPERIN (France), JISC (U.K.), ABM-utvikling (Norway).

Within the next few months SCOAP³ aims to federate similar agents worldwide.
The SCOAP³ model will only be successful if partners from all countries contributing to HEP literature become members of the consortium. Indeed, a pillar of the model is to ensure OA to all HEP articles appearing in high-quality journals through this co-ordinated effort.

SCOAP³ will be financed primarily by HEP funding agencies, laboratories and libraries, from funds currently used for journal subscriptions. However, it will also engage other bodies interested in the broad and free dissemination of scientific information. Each country will contribute to SCOAP³ according to its share of the authorship of HEP articles as described in Section 4. For the SCOAP³ model to be successful, it has to represent a stable, viable and sustainable alternative to subscriptions *vis-à-vis* its partners. It is therefore expected that the SCOAP³ operation will follow the financial blueprints of large scientific collaborations laid down in corresponding Memoranda of Understanding.

An important asset of the SCOAP³ model is that it will centralize all OA expenses that will therefore not have to be directly borne by authors and research groups. This contrasts with so-called "author-pays" OA options, offered by many publishers but of scarce success in HEP, which are perceived as an even higher barrier than subscription charges, in particular for theoretical physicists from small institutions who actually produce the vast majority of HEP articles.

Manuscripts from authors without academic affiliation or authors from countries with no funding of HEP research and which, therefore, cannot be reasonably expected to contribute to the Consortium at this time, will be treated like all other articles submitted for publication. This choice has obvious ethical reasons: namely

not to preclude any author from the benefits of the peer-review service. In addition, it has sound practical and financial reasons: restricting OA privileges to authors from a selected set of countries would simply replace the present toll-access barriers by other limitations based on the geographical origin of authors. Conversely, if only a geographically defined subset of the HEP literature were to become available in OA, consortium members would still have to purchase the remaining subset and part of the benefits from the OA transition would thus be lost.

It is expected that SCOAP³ will contribute to stabilizing the rising cost of access to information in the HEP domain by virtue of its representation of an important array of particle physics institutes and funding agents, by increasing the author awareness of costs and prices, by linking price to value, and by fostering new competition in the market.

One model, two implementations

A large fraction of the publications on "core" HEP subjects is published in a limited number of journals, as detailed in Section 3. Among those journals, some carry almost exclusively HEP content. SCOAP³ aims to assist publishers to convert these "core" HEP journals entirely to OA. It is expected that the vast majority of the SCOAP³ budget will be spent on these through a "lump-sum" payment model: SCOAP³ pays a negotiated price for the peer-review and OA dissemination of all articles of the journal. Obviously, the entire journal will be available online to read for anyone without paying any subscription. On the other hand, some articles relevant to HEP appear in "broadband" journals that carry just a small fraction of HEP content. It is expected that the OA conversion of these articles will be sponsored by SCOAP³ on a "pay-per-article" basis. Clearly, the subscription prices of "broadband" journals are expected to be decreased accordingly.

Conference proceedings and monographs are not within the scope of the SCOAP³ budget. In the case of conference proceedings, OA should be realized by the conference organizers through their choice of publishing outlets.

The life-cycle of a SCOAP³ OA article

The SCOAP³ transition to OA aims to be transparent for authors. The life-cycle of a SCOAP³ article may start in any country when it is submitted to one of the high-quality journals that are partners of SCOAP³. The submission will be in all cases free of charge since the peer-review and publication costs are supported by SCOAP³.

The journals will process the article through their peer-review system. Upon acceptance, the article will immediately be published OA on the publishers' web site and at the same time will be sent, together with all related metadata, to a repository designated by SCOAP³ as discussed in Section 5. From there, mirror copies to other repositories will ensure the widest possible dissemination and long-term preservation of the article. This population of repositories with final versions of peer-reviewed articles will become the norm within the HEP community. It will generate a new e-infrastructure for e-Science providing among other things:

- a freely accessible source of data for text- and data-mining applications;
- a comprehensive, freely available, citation index for HEP publications;
- a system to continuously measure the scientific production of individual countries, which is at the basis of sharing the costs of SCOAP³.

Access to previously published literature

As in most sciences, research in HEP relies heavily on previously published work. In the case of specialized journals, citations often refer to earlier articles published within the same journal or in other "core" HEP journals. Hence, it is a legitimate expectation of the reader community to have access to these earlier articles that are contained in "back-files" of the publishers. SCOAP³ will address the access issue in two different ways, depending on the formats in which these back-files are currently preserved and made available.

- Some current journal subscriptions include access to a limited number of previous editions. These include typically the recently-digitised yearly collections of long-standing journals or the entire production in the case of new (electronic) journals. For some other titles the subscriptions cover a fixed number of years within a "sliding window". In the SCOAP³ model, publishers will be required to provide free access to the same volume of back-files as they presently make available in their subscription models.
- Some journals have recently made available digitised versions of their entire "historic" archive including in some cases also precursor titles. Access to these back-files is possible today through annual subscriptions or through a single "one-off" payment. In the SCOAP³ model publishers will be invited to make an offer for providing OA to these "historic" back-files.

Roles of and benefits for publishers

In the SCOAP³ model, the publishers will continue to have the primary responsibility of ensuring the highest standards of quality for the published articles through independent editorial boards and peer review. They will ensure the dissemination of

OA articles by posting them on their web site, without any access barrier, and by feeding them to a SCOAP³ repository.

Publishers will benefit from a more sustainable business model than the traditional subscription scheme, which is becoming increasingly fragile. Furthermore, they will continue to meet the demands and charge for "premium" services and products outside the scope of SCOAP³, such as: print subscriptions, re-prints of single articles, colour plates in these printed versions, collections of articles in electronic or paper form, access to metadata databases.

Roles of and benefits for funding agencies

According to the OA paradigm, the costs of scientific publications, which are predominantly those of the organisation of the peer-review process, central to science, should be shifted from the reader community to the author community. In HEP, these two communities are largely overlapping and are funded by the same entities. Funding agencies are therefore at the pivot point of the transition to OA in scientific publishing and the ultimate decision and responsibility for the operation rests with them.

Funding agencies will be the key players in financing SCOAP³ both directly and indirectly, according to the systems of each country. Funds will come from the re-direction of subscriptions that are paid directly by the funding agencies, or by additional investments in the OA transition. Funding agencies will be instrumental in engaging the national bodies paying subscriptions to publishers to re-direct those funds towards SCOAP³. They will also play a role of paramount importance in raising the OA awareness of their author base.

In the long run, funding agencies will profit from the savings due to the cost-effective publication strategy offered by SCOAP³. They will also benefit from a more stable and competitive publication market. Finally, they will profit from the broader visibility under OA tenets of the research they sponsor.

Roles of and benefits for libraries

Most scientific libraries are currently federated into consortia, primarily on a national or regional basis, and their actions are often linked to the main territorial funding agencies, e.g. COUPERIN in France, grouping some 200 libraries and maintaining strong links to CNRS, INSERM and INRA. In Germany the consortia are organized at the level of the Länder and in Belgium separately for the two main linguistic communities. In the present system, these consortia negotiate with publishers; they

also pool their budgets in paying access fees to electronic collections. These national and regional library consortia are considered as natural candidates for participation in SCOAP³.

In the OA era, libraries will continue to serve the scientific community by providing access to the entire, multi-disciplinary, scientific literature including the HEP articles to be published in OA journals. How the libraries will be involved financially regarding OA publishing will obviously vary from country to country, depending on the specific financing model chosen. Some countries might transfer parts of the current subscription budget to the research sector, earmarked for publication costs, while other countries might choose to ask their universities to pay publication costs *pro rata* for their affiliated authors via their libraries.

The transition to OA will allow libraries to move towards new services, directed towards e-Science, which could not be developed under the subscription model with its permission barriers. In addition, the library community will play a fundamental role in the long-term archiving of the OA articles.

3. The scope of SCOAP³

The definition of HEP articles

The notion of HEP is usually linked to the theoretical and experimental study of particles produced at accelerators of ever-increasing energies. Its definition has evolved to include subjects traditionally closer to fields like nuclear physics, astro-particle physics and cosmology. Different authors, journals and funding agencies focus on different parts of the HEP "spectrum".

In order to be successful, SCOAP³ has to target the subset of HEP literature that addresses the broadest possible HEP authorship and readership. A minimal set of common interest, the "core" HEP subjects, includes theory and phenomenology of elementary particles, their experimental investigations, quantum-field theory, and lattice-field theory. These are loosely related to the *hep-th, hep-ph*, *hep-ex*, and *hep-lat* categories of the arXiv.org repository; however, these categories often also carry content in cognate disciplines. The scope of SCOAP³ should be clearly extended to cover ancillary subjects such as experimental techniques as well as mathematical and numerical methods related to HEP.

The DESY classification

The documentation group of the DESY Library has a long tradition of selecting and classifying pre-prints, journal articles, monographs and conference contributions of relevance to the HEP community for their inclusion in the popular SPIRES database. Their established procedure can be used to define an extension of the "core" areas of HEP towards a wider definition of HEP literature.

Subjects primarily associated with other fields but clearly connected to HEP include:

- nuclear physics (high energy nuclear reactions, relativistic heavy ion scattering, hyper-nuclei, double beta decay, neutrinos, quarks, gluons, QCD, meson production, meson- and hyperon-induced reactions);
- astrophysics (neutrino mass, flavour and oscillation, very high energy cosmic radiation, air showers, strange stars, postulated particles, dark matter candidates);
- gravitation and cosmology (quantum gravity and cosmology, field-theoretical models, higher dimensions, super-gravity, quantum aspects of black holes, string and brane models, inflation, gravitational waves);
- border areas including atomic physics, quantum physics, condensed matter, antimatter and fundamental constants.

As the borders between these related disciplines are not well defined, part of the literature in these connected fields will naturally be included along with the "core" HEP subjects by the selection of HEP journals along the lines discussed in the following.

The HEP publishing landscape

The DESY classification presented above has been used to select all articles relevant to HEP and published in peer-reviewed journals in 2005, excluding conference proceedings, editorials and other material outside the scope of SCOAP[3]. About 8'500 articles are selected; these are published in about 150 journals[7]. Of these articles, 5'200 deal with "core" HEP topics of theory and phenomenology of elementary particles, their experimental investigations, quantum-field theory, and lattice-field theory. The vast majority of these articles concern phenomenology and theory and have on average between two and three authors. Publications on experimental results, often authored by up to 800 researchers, account for less than 10% of the total.

[7] Only journals with more than 10 articles relevant to HEP are considered to count the total number of articles.

Table 1 presents the most popular HEP journals, their publishers, their ISI impact factor (IF[8]), the total number of articles published in 2005[9] (N_{tot}), the number of articles that satisfy the DESY HEP-article definition (N_{HEP}), and the number of "core" HEP articles (N_{core}). The last two columns show the fractions f_{HEP} and f_{core} of DESY-tagged HEP articles and "core" HEP articles, respectively. Only journals with N_{HEP}>100 are shown; they are ordered by N_{core}. About 75% of the HEP articles in its broader definition, and about 85% of the "core" HEP articles, are carried by just six journals from four publishers.

Candidate journals for conversion to OA in the SCOAP³ model

A recent study[10] analysed about 5'000 "core" HEP articles submitted in 2005 to the arXiv.org repository in the *hep-ex*, *hep-lat*, *hep-ph*, *hep-th* categories and subsequently published in peer-reviewed journals. Almost 90% of the articles appeared in the top six peer-reviewed journals listed in Table 1.

Five out of these six journals carry a majority of HEP content; these are:

- *Physical Review D* (published by the American Physical Society),
- *Physics Letters B* (Elsevier),
- *Nuclear Physics B* (Elsevier),
- *Journal of High Energy Physics* (SISSA/IOP),
- *European Physical Journal C* (Springer).

SCOAP³ aims to assist publishers to convert these "core" HEP journals entirely to OA.

As described in the last column of Table 1, these five "core" journals include up to 30% of articles in nuclear physics, astro-particle physics and other subjects beyond the "core" HEP topics. These articles will be naturally and logically included in the OA transition along the proposed scheme. This is in the interest of the HEP readership and promotes the long-term goal of an extension of the SCOAP³ model to these related disciplines.

The sixth journal, *Physical Review Letters* (American Physical Society), is a "broadband" journal that carries only a small fraction (10%) of HEP content. SCOAP³

[8] The IF of a journal is calculated by dividing the number C of citations during year Y to articles published in the years Y-1 and Y-2 by the number P of articles published in the years Y-1 and Y-2; IF=C/P.

[9] Values of N_{tot} may differ slightly from those obtained by alternative methods, e.g. through queries to popular databases, since, in the present study, articles not relevant for the scope of SCOAP³, e.g. conference proceedings and editorials which are not always tagged in the databases, have been removed by hand

[10] S. Mele *et al.*, JHEP 12 (2006) S01; arXiv:cs.DL/0611130.

aims to sponsor the conversion to OA of this fraction on an article-by-article basis. In addition, SCOAP³ intends to sponsor the conversion on an article-by-article basis of the HEP-related part (about 25%) of *Nuclear Instruments and Methods in Physics Research A* (Elsevier), which is a popular "broadband" journal in instrumentation and measurement techniques[11].

In summary, taking the DESY classification as the reference, the five "core" HEP and two "broadband" journals together covered in 2005 about 4'200 articles tagged as belonging to the "core" HEP subjects and about 5'300 articles in the broader HEP definition. The full conversion to OA of the five "core" HEP journals and the partial conversion of the two "broadband" journals would cover over 80% of the "core" HEP subjects and over 60% of the entire HEP literature, including all related subjects. Table 2 summarises these numbers.

The remaining 3'300 articles, tagged by the DESY classification as being of interest to the HEP community, not published in the journals mentioned above are scattered over some 140 other journals. Of these articles, 980 are related to gravitation and cosmology, 685 to astrophysics, 450 to nuclear physics, 120 to instrumentation and detector technology, and 115 to general theoretical physics.

It is important to note that the SCOAP³ model is not intended to be limited to the journals spotlighted by this study but is open to all existing and future high-quality journals carrying HEP content, within budgetary limits. This will ensure a dynamic market with competition and choice.

[9] Another "broadband" instrumentation journal of interest is the *Journal of Instrumentation* (SISSA / IOP), which could be converted, in the same scheme. It is not included in this study since it only started publishing in 2006, with 44 articles and a HEP fraction of 50%.

Journal	**Publisher**	**IF**	$\mathbf{N_{tot}}$	$\mathbf{N_{HEP}}$	$\mathbf{N_{core}}$	$\mathbf{f_{HEP}}$	$\mathbf{f_{core}}$
Phys. Rev. D	APS	4.8	2285	2101	1635	92%	72%
JHEP	SISSA/IOP	5.9	859	859	840	100%	98%
Phys. Lett. B	Elsevier	5.3	957	862	740	90%	77%
Nucl. Phys. B	Elsevier	5.5	522	481	465	92%	89%
Phys. Rev. Lett.	APS	7.5	3836	407	279	11%	7%
Eur. Phys. J. C	Springer	3.2	331	272	234	82%	71%
Mod. Phys. Lett. A	World Scientific	1.2	281	216	138	77%	49%
Phys. Rev. C	APS	3.6	853	298	136	35%	16%
Class. Quant. Grav.	IOP	2.9	491	255	89	52%	18%
Int. J. Mod. Phys .A	World Scientific	1.5	878	143	88	16%	10%
J. Math. Phys.	AIP	1.2	446	108	74	24%	17%
Phys. Atom. Nucl.	Springer	0.9	220	106	72	48%	33%
JCAP	SISSA/IOP	6.7	156	128	57	82%	37%
Gen. Rel. Grav.	Springer	1.6	190	103	20	54%	11%
Nucl. Instrum. Meth. A	Elsevier	1.2	1371	312	16	23%	1%

Table 1: Summary of the most popular HEP journals: their publishers, ISI impact factors (IF), the total number of articles published in 2005 (N_{tot}), the number of articles which satisfy the DESY HEP-article definition (N_{HEP}), and the number of "core" HEP articles (N_{core}). Only journals with N_{HEP}>100 are shown; they are ordered by N_{core}. The last two columns show the fractions f_{HEP} and f_{core} of HEP and "core" HEP articles, respectively.

$N_H(T)$	Total number of HEP articles	8500	
$N_C(T)$	Total number of "core" HEP articles	5219	61% of $N_H(T)$
$N_T(C)$	Total number of articles in the 5 core journals	4951	
$N_H(C)$	HEP articles in the 5 core journals	4572	92% of $N_T(C)$
$N_C(C)$	"Core" HEP articles in the 5 core journals	3914	79% of $N_C(C)$
$N_H(B)$	HEP articles in the 2 broadband journals	719	
$N_C(B)$	"Core" HEP articles in the 2 broadband journals	295	41% of $N_H(B)$
$N_H(C)+N_H(B)$	HEP articles in core and broadband journals	5291	62% of $N_H(T)$
$N_C(C)+N_C(B)$	"Core" HEP articles in core and broadband journals	4209	81% of $N_C(T)$

Table 2: Numbers of articles in different categories published in 2005 in the five "core" HEP journals that are proposed for entire conversion to OA and into the two "broadband" journals that are proposed to be partially converted to OA, as discussed in Section 3.

4. The financing of SCOAP³

In the era of electronic journals, the price of a journal is mainly driven by the costs of running the peer-review system, by editorial costs for copy-editing and typesetting, by the cost for electronic publishing and access control, and by subscription administration. Most publishers today quote a cost, from reception of the manuscript to final publication, in the range of 1'000 –2'000 Euros per published article[12]. This includes the cost of processing articles that are eventually rejected, the fraction of which varies substantially from journal to journal. The SCOAP³ model will eliminate the costs of access control and subscription administration.

The annual budget for a transition of HEP publishing to OA can be estimated from this figure and from the fact that the five "core" HEP journals, which cover a large fraction of the HEP literature, as discussed in Section 3, publish about 5'000 articles per year. Hence, we estimate that the annual budget for a transition of HEP publishing to OA would amount to a maximum of 10 Million Euros per year.

Another indication which corroborates this estimate is that the costs to run a "core" HEP journal such as *Physical Review D* amount to 2.7 Million Euros per year[13] and it covers about one third of all HEP publications.

A "fair-share" scenario for the financing of SCOAP³ is to distribute these costs among all participating countries on a pro-rata basis, taking into account the relative fraction of authorship of HEP articles. To cover publications from scientists from countries that cannot be reasonably expected to contribute to the consortium at this time, an allowance of not more than 10% of the SCOAP³ budget is foreseen.

The fraction of HEP authorship of each country is estimated using a recent study[14] of the authorship of articles in the seven journals spotlighted for conversion to OA as discussed in Section 3. This study considered all articles published in the years 2005 and 2006 in the five HEP "core" journals, *Physical Review D*, *Physics Letters B*, *Nuclear Physics B*, *Journal of High Energy Physics* and the *European Physical Journal C*, as well as those HEP articles published in the two "broadband" journals, *Physical Review Letters*

[12] M. Blume, Round table discussion: Policy Options for the Scientific Publishing System in FP7 and the European Research Area. Conference on Scientific Publishing in the European Research Area: Access, Dissemination and Preservation in the Digital Age, Brussels 15-16 February 2007.
[13] M. Blume, *ibid*.
[14] J. Krause, C.M. Lindqvist and S. Mele, in preparation. The publications of two years were used in this case in order to obtain a larger data sample. No significant differences are observed between the fractions in the two separate years.

and *Nuclear Instruments and Methods in Physics Research A*. A total sample of about 11'300 articles was considered. For each article, all authors were uniquely assigned to a given country. In this context CERN was treated as an additional "country".

In about 5% of the cases, authors were found to have multiple affiliations, often in different countries, reflecting the intense cross-border tradition of HEP. In these cases, the ambiguity in the assignment of authors to countries was solved by using the following guiding principles:

- If one of the multiple affiliations of an author is CERN, the author is assigned to CERN.
- If one of the multiple affiliations of an author is a HEP laboratory, the author is assigned to the host nation of that laboratory.
- The remaining multiple-affiliation cases were resolved by assigning the author to the country with the largest *per capita* gross domestic product[15]. If among the multiple affiliations there were two or more HEP laboratories, the same principle was applied by considering the *per capita* gross domestic products of the corresponding host countries.

The results from this study are summarized in Table 3 and Figure 1. The contribution of CERN and the CERN Member States[16] is 41.0% while that of the United States is 24.3%. The countries with the next-largest shares are Japan with 7.1% and China with 5.6%.

The determination of the pro-rata fractions for all participant countries will be repeated every year and whenever a change of the scope of SCOAP³ makes it necessary.

[15] International Monetary Fund, World Economic Outlook Database, September 2006.
[16] The CERN Member States are Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Italy, the Netherlands, Norway, Poland, Portugal, the Slovak Republic, Spain, Sweden, Switzerland and the United Kingdom.

Country	Share of HEP Scientific Publishing	Country	Share of HEP Scientific Publishing
United States	24.3%	Netherlands	0.9%
Germany	9.1%	Portugal	0.9%
Japan	7.1%	Taiwan	0.8%
Italy	6.9%	Mexico	0.8%
United Kingdom	6.6%	Sweden	0.8%
China	5.6%	Belgium	0.7%
France	3.8%	Greece	0.7%
Russia	3.4%	Denmark	0.6%
Spain	3.1%	Australia	0.6%
Canada	2.8%	Argentina	0.6%
Brazil	2.7%	Turkey	0.6%
India	2.7%	Chile	0.6%
CERN	2.1%	Austria	0.5%
Korea	1.8%	Finland	0.5%
Switzerland	1.3%	Hungary	0.4%
Poland	1.3%	Norway	0.3%
Israel	1.0%	Czech Republic	0.3%
Iran	0.9%	Remaining countries	3.1%

Table 3: Contributions by country to the HEP scientific literature published in journals spotlighted in Section 3 for conversion to OA. Co-authorship is taken into account on a pro-rata basis, assigning fractions of each article to the countries in which the authors are affiliated. The last cell aggregates contributions from countries with a share below 0.3%. This study is based on all articles published in the years 2005 and 2006 in the five HEP "core" journals: Physical Review D, Physics Letters B, Nuclear Physics B, Journal of High Energy Physics and the European Physical Journal C, and the HEP articles published in two "broadband" journals: Physical Review Letters and Nuclear Instruments and Methods in Physics Research A, tagged as described in section 3. A total sample of almost 11'300 articles is considered (From J. Krause, C.M. Lindqvist and S. Mele, http://doc.cern.ch/archive/electronic/cern/preprints/open/open-2007-014.pdf).

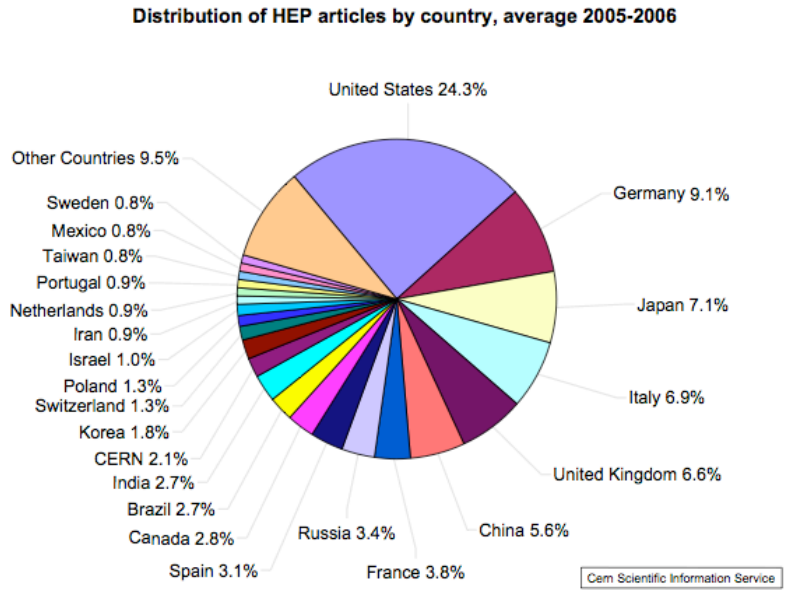

Figure 1: Contributions by country to the HEP scientific literature published in journals spotlighted in Section 3 for conversion to OA. Co-authorship is taken into account on a pro-rata basis, assigning fractions of each article to the countries in which the authors are affiliated. The last cell aggregates contributions from countries with a share below 0.3%. This study is based on all articles published in the years 2005 and 2006 in the five HEP "core" journals: Physical Review D, Physics Letters B, Nuclear Physics B, Journal of High Energy Physics and the European Physical Journal C, and the HEP articles published in two "broadband" journals: Physical Review Letters and Nuclear Instruments and Methods in Physics Research A, tagged as described in Section 3. A total sample of almost 11'300 articles is considered Countries with individual contributions less than 0.8% are aggregated in the "Other countries" category. (From J. Krause, C.M. Lindqvist and S. Mele, http://doc.cern.ch/archive/electronic/cern/preprints/open/open-2007-014.pdf)

5. The tendering requirements

This Section describes the selection criteria for journals and the requirements that will form the basis of the contracts with the selected publishers. Financial and transition aspects are addressed at the end.

Selection criteria

1. **Journal scope.** SCOAP³ will select among existing or future journals interested in publishing HEP articles, as discussed in Section 3.
2. **Journal standing.** The high quality of the journals is of paramount importance in the SCOAP³ model. For well-established journals criteria such as, but not limited to, the ISI impact factor will be used to assess the journal standing. For new journals, criteria such as the profile of the editorial board or the size of the author and reader base will be considered.
3. **Peer-review process.** Rigorous, high-quality peer-review is a central component of the SCOAP³ model. SCOAP³ will require journals to ensure an independent peer-review process of the highest standard, of a reasonable duration. The acceptance and rejection rates, which contribute to indicating journal quality, have to be made available for assessment and monitoring purposes.

Requirements

The OA tenets of "open and unrestricted access to research literature" apply throughout the life of a scientific result and, of course, also in the remote future. The contracts to be signed with publishers shall, *inter alia*, include the following conditions:

1. The articles shall be made available on an irreversible OA basis;
2. There shall be immediate and free access via the internet to the publisher-formatted full text of the articles and the corresponding metadata, as published on the publisher's Web site;
3. Publishers shall deliver to a repository designated by SCOAP³ the final version of the articles as well as the corresponding metadata and interoperable usage statistics as detailed in *Annex 1* and *Annex 2*, respectively;
4. There shall be free transfer of the articles and the corresponding metadata to any further repository, through the intermediary of the repository designated by SCOAP³;

5. There shall be free extraction and re-using of the figures (*e.g.* in conference presentations and further articles), tables and numerical data (*e.g.* for re-interpretation or statistical combination with other results) included in the articles;
6. There shall be free use of the articles and corresponding metadata for text- and data-mining applications;
7. Authors shall be free to post pre-prints and post-prints to subject and institutional repositories;
8. Publishers shall pro-actively support publisher-independent long-term preservation through repositories and national libraries;
9. Upon the acceptance of an article, publishers shall transmit the corresponding metadata to *crossref.org*;
10. Publishers shall accept direct submission to their journals from selected subject and institutional repositories, such as arXiv.org, SPIRES, CDS, HAL, *etc.*

Any re-use of the articles and the corresponding metadata shall of course acknowledge the authors and the published reference.

Financial aspects

1. **Payment model.** The decision upon a lump sum payment or the pay-per-article model will be made according to whether the journal in question publishes mostly HEP articles ("core" HEP journal) or only some HEP articles ("broadband" journal). Conference proceedings and monographs are outside the scope of SCOAP³, as discussed in Section 2.
2. **Visibility of OA fraction.** In the case of "broadband" journals, the fraction of articles with HEP content converted to OA has to be explicitly visible.
3. **Access to back-files**. Some current subscriptions include access to a limited number of previous editions of journals. Publishers will be required to provide free access to the same volume of back-files as they presently make available in the subscription model, with the same modalities of the OA articles whose peer-reviewing costs have been covered by SCOAP³. In addition, publishers will be invited to submit an offer for granting similar permanent access to "historic" back-files, the digitised version of all the issues of a journal.

Transition aspects

1. **Journal licence packages.** In the case of a "core" HEP journals (where an entire journal is converted to OA) that is part of a large journal licence

package, the publisher will be required to un-bundle this package and to correspondingly reduce the subscription cost for the remaining part of the package.

2. **Partially-converted journals.** For "broadband" journals (where only the conversion of selected HEP articles is paid by SCOAP³), the subscription costs are required to be lowered according to the fraction supported by SCOAP³. For journals of this kind that are part of a licence package, the reduction should be reflected in a corresponding reduction of the package subscription cost.
3. **Library subscriptions.** In the case of existing long-term subscription contracts between publishers, libraries, and funding agencies, publishers are required to reimburse the subscription costs pertaining to OA journals or to the journal fractions converted to OA. To avoid administrative complications, libraries may forgo individual reimbursements as a contribution to SCOAP³.

6. The next steps

The SCOAP³ Working Party was mandated by leading European HEP funding agencies, HEP laboratories and library consortia to explore the possibility of converting HEP scientific publishing to OA. This Report presents a model to achieve this transition, timely and effectively, for the benefit of all stakeholders: authors, readers, funding agencies, libraries and publishers.

The next step towards OA publishing in HEP is the acceptance of the model proposed in this Report by the entities that mandated its preparation.

The fundamental pillar of the SCOAP³ model is the federation of HEP funding agencies and library consortia worldwide. HEP is a worldwide scientific enterprise and the conversion to OA of its literature, with all the ethical, scientific and financial benefits it implies, can only be achieved in a global co-ordinated process. A crucial step towards OA publishing in HEP is therefore the search for a worldwide consensus around the model proposed in this Report, aiming to federate HEP funding agencies and library consortia in Europe, the Americas and Asia, with a pro-active stance in exploring possible funding channels.

Once sufficient funds will have been pledged towards the establishment and the operation of SCOAP³, a tendering process will take place, hopefully during summer 2007. Provided that the SCOAP³ funding partners are ready to engage into long-term

commitments, most publishers are expected to be ready to enter into negotiations along the lines presented in this Report.

The outcome of the tendering process will allow, after a few months, the complete SCOAP³ budget envelope to be precisely known, as well as the contribution expected from each country. A Memorandum of Understanding for the governance of SCOAP³ and the initial cost sharing will then be signed by funding agencies and leading national and international library consortia. Contracts with publishers will be established in order to make Open Access publishing in High Energy Physics a reality at the beginning of 2008, when the flow of experimental and theoretical publications on data from the LHC program will start.

The conversion of the HEP scientific publishing to the OA paradigm, along the lines presented in this Report, will be an important milestone in the history of scientific publishing. The SCOAP³ model could be rapidly generalized to other disciplines and, in particular, to related fields such as nuclear physics or astro-particle physics.

Annex 1:

Technical requirements for metadata

The data set

Metadata provided by the publishers will serve two purposes:

- to relay bibliographic information to (meta) search engines;
- to gather data for cost-sharing accounting within SCOAP³.

The bibliographic information must be sufficiently comprehensive to allow the correct citation of the item to be made; it should also include a persistent pointer to the full-text version of the item. The information datasets must be guaranteed to be correct and complete.

The minimum set of data must have the following items included: title; author (one author per field); affiliation (with obvious correlation to author); ISSN; journal title, volume; issue; page (first, last) or article number and number of pages; publication year; publisher; DOI.

Furthermore, the following set of supplementary information are desirable: URL; resource type; copyright; PACS; (author-defined) keywords; abstract; publication date; external reference (*e.g.* the arXiv.org number if the article is contained in that repository); citations; date of acceptance; date of submission.

For accounting purposes within SCOAP³ it must be possible to automatically extract all authors from the metadata and to relate them to their affiliations. The affiliation descriptors (names, addresses) have to be standardized to facilitate the identification of SCOAP³ participants.

Transport formats

Since internationally accepted exchange formats such as MARC-XML and Dublin Core are not ideally suited for transporting all the information specified above, stable formats defined by the publishers will be accepted.

Character encoding must be Unicode. The textual contents of all data must be identical to the published version, e.g. special characters in author names which are uniquely represented in Unicode. The title must be identical to that in the printed version; e.g. mathematical formulas, equations, symbols etc. are represented in

HTML or (La)TeX. Additional title versions (plain ASCII, different language) may be supplied.

Annex 2:

Specifications for providing interoperable usage statistics

Publishers should provide COUNTER compliant statistics (Release 2 for journals), on the article level, enhancing the granularity of Release 2. These should be provided either as web-service using the SUSHI XML schema (NISO draft standard), or using OAI PMH and OpenURL Context Objects (NISO Z39.88-2004).

Publishers should allow SCOAP³ to forward COUNTER compliant statistics to aggregating services of consortia, universities or scientific societies without additional costs. Aggregating services should be allowed to merge the statistics provided with statistics from disciplinary or institutional repositories.

Glossary

"Author-side funding" model: A publishing model alternative to the "reader-side funding" model, currently prevailing. With "author-side" funding, authors bear the costs incurred in the publication of their articles, usually through their funding agencies. OA models are by definition "author-side funding" models. However, in the publication scheme discussed in this Report, the publication charges are paid by the SCOAP³ consortium; hence, authors do not have to directly deal with publication costs.

"Broadband" journals: Journals containing articles from a broad range of fields, as opposed to "core" journals containing articles relevant to a very specific field.

"Core" journals: Journals devoted mainly to articles dealing with subjects of a specific field. In this Report, the expression "core" HEP journal is used to designate journals mostly containing articles relevant to the field of HEP.

e-Science: Computationally intensive science that is carried out in highly-distributed network environments, or science that uses large data sets that require the application of grid computing. In a larger sense, e-Science also indicates technologies that enable distributed collaboration. HEP is a discipline with a well-developed e-Science infrastructure due to its need for adequate computing facilities for the analysis of results and storage of data originating from the CERN Large Hadron Collider as well as its widely-distributed collaborative nature.

"Gold" OA: A way to achieve Open Access to scientific reports warranting free information availability on the public Internet, permitting any user to read, download, copy, distribute, print, search, or link to the full text of peer-reviewed articles, crawl them for indexing, pass them as data to software, or use them for any other legal purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself (source: *Budapest declaration* *http://www.soros.org/openaccess/read.shtml*)

"Green" OA: A way to achieve Open Access to scientific reports through the author submission of pre-prints and post-prints to repositories where they are accessible through the Internet to any reader. In some disciplines some journals require a certain "embargo" following the article publication for the author to be allowed to

submit the publication to a repository. "Green" OA envisages the maintenance of subscriptions for the access to peer-reviewed journals.

"Hybrid model": Within the usual subscription scheme, this model implies that authors pay a supplement to the publisher for making their articles available OA. In the context of SCOAP³, the hybrid model implies that the Consortium is sponsoring OA for those articles of a "broadband" journal that are recognized as relevant to HEP. However, the subscription price of these journals will be lowered to reflect the fraction of OA articles, whereas in current experimental hybrid models this is rarely the case.

High Energy Physics (HEP): The field of particle physics dealing mainly with the study of elementary particles and their interactions.

Impact factor (IF): A quantitative tool for ranking, evaluating, categorizing, and comparing journals. It is a measure of the frequency with which the "average article" in a journal has been cited in a particular year or period. The IF of a journal is calculated by dividing the number C of citations during year Y to articles published in the years Y-1 and Y-2 by the number P of articles published in the years Y-1 and Y-2; IF=C/P.

***Journal articles*:** Quality-controlled articles appearing in scientific journals, describing scientific results, peer-reviewed by specialists of the field and copy-edited by the journals.

Long-term archiving: The preservation of the content of electronic or paper journals aimed to ensure the published articles are available and accessible on extremely long time scales, possibly irrespectively of the long-term future of particular publishing companies.

Memorandum of Understanding (MoU): Document describing the terms for sharing the costs and responsibilities within large, multi-institutional collaborations, typical of HEP experiments. In the context of this Report, it is the document to be signed by the SCOAP³ members, describing the governance and cost sharing, and acting as a legally binding document for all participants.

Open Access (OA): Immediate, free and unrestricted online access to digital scholarly material, primarily peer-reviewed scholarly journals. OA was made possible by the advent of the Internet. OA removes price barriers such as subscriptions, licensing

fees, pay-per-view fees, and permission barriers in the form of copyright and licensing restrictions.

Open Access journals: Journals that publish peer-reviewed articles and make the approved, final, versions freely available on the Internet. The production costs of OA journals are met with author-side funding through publication charges or sponsoring.

Open Access Movement: A loosely connected worldwide movement of scholars, research libraries, funding agencies, some publishers and other stakeholders of the scholarly research process in favour of the broadest possible dissemination of, and free access to, the results of scientific research.

Peer review: The process by which the quality of an article submitted for publication is verified. It is organized by the publisher but performed by specialists (peers) of the field. The result of peer reviewing is either the acceptance of the article for publication or its rejection. During the process, authors are often advised to modify their manuscript before publication.

Post-prints: Author-generated versions of pre-prints including all modifications added during the peer-review process.

Pre-prints: Articles describing scientific results, made available by the authors prior to the formal publication in peer-reviewed journals; it is today the vehicle for rapid exchange of information within some scientific fields.

Pre-print culture: The habit, well established in the physics community, of depositing (even preliminary) results in the form of pre-prints in repositories with Internet access, and making use of the pool of pre-prints already available for rapid communication and feedback.

"Pro-rata" sharing of costs (in the SCOAP³ model): Cost sharing between countries, calculated according to the fractional number of authors affiliated to a given country and contributing to publications in HEP.

Repositories: Electronic databases where preprints and journal articles describing the results of scientific research are stored. They do not perform peer-review but simply make the author-deposited contents freely available. They may contain at once pre-prints before peer-review and author-produced post-prints very close to the

final journal articles. Notable examples are arXiv.org, initiated at Los Alamos and now at Cornell; the SPIRES database, born at Stanford and now numbering many contributors among which DESY in Hamburg; and the CERN Document Server. These are all "subject" repositories, containing articles of relevance for a given field. Research centres and universities often have their own *institutional* repositories (e.g. [redacted]).

Re-prints: Printed version of single articles published in peer-reviewed journals, provided by publishers. The first few copies are usually free of charge while authors can purchase additional copies.

SCOAP³: Sponsoring Consortium for Open Access Publishing in Particle Physics. It is envisaged as a central network of funding agencies, research laboratories and libraries, mandated to collect funds for financing OA in the field of HEP, to negotiate prices with publishers, and to remunerate them for their OA journals.

Serials crisis: The spiralling of subscription costs above the general inflation rate, which is observed today in scientific literature and forces libraries to cancel subscriptions of important "core" journals, depriving their users of access to valuable information.

Subscription model: The current paradigm in scientific publishing in which the reader (or an institutional library on his behalf) pays a subscription fee for receiving printed copies of journals or getting electronic access to them (if available). It is also called the "reader-side funding" model.

Statements in favour of the OA publishing policy

(In reverse order of date)

- The following statement was approved by the ALICE, ATLAS, CMS, LHCb and TOTEM Collaboration Boards in February-March 2007:
  We the ALICE / ATLAS / CMS / LHCb / TOTEM Collaboration strongly encourage the usage of electronic publishing methods for ALICE / ATLAS / CMS / LHCb / TOTEM publications and support the principle of Open Access Publishing, which includes granting free access of our ALICE / ATLAS / CMS / LHCb / TOTEM publications to all. Furthermore, we encourage all ALICE / ATLAS / CMS / LHCb / TOTEM members to publish in easily accessible journals, following the Open Access Paradigm.

  - The ALICE Collaboration represents over 1'000 physicists, engineers and technicians from 104 institutions and 30 countries;
  - The ATLAS Collaboration represents about 1'800 physicists including about 400 students from 150 universities and laboratories spread over 35 countries;
  - The CMS Collaboration represents about 2'000 scientists and engineers including 400 students from 159 institutions spread over 35 countries;
  - The LHCb Collaboration represents about 600 physicists from 46 universities and other institutions spread over 14 countries;
  - The TOTEM Collaboration represents about 135 physicists from 20 universities and other institutions spread over 14 countries.

- Prof. Torsten AKESSON, Chairman of the European Commission for Future Accelerators (ECFA), Dec 1, 2006
  ECFA is in general positive towards a transition to Open Access publishing. The aim should be to implement it synchronous with the first articles from LHC.

- Prof. Dr. Metin MARIK, President of the Balkan Physical Union, November 3, 2006
  The Balkan Physical Union considers the Open Access Initiative to be a very positive step for scientific progress.

- Dr. David C PROSSER, Director, SPARC Europe, November 3, 2006
  CERN is at the forefront of both thinking about open access and its implementation. This is an immensely exciting prospect and one that SPARC Europe fully supports. We wish CERN and its partners every success with this hugely important effort.

- Peteris ZILGALVIS, Head of Unit, Governance and Ethics European Commission, Research Directorate-General, Science, Economy and Society Directorate, November 3, 2006
  The European Commission is favourable to experimentation with new publishing models such as SCOAP³ seen as a pilot project for future developments in scientific publishing.

- Springer Publishing Company, November 1, 2006
  The EPJ publishers are prepared to move the EPJ journals to "OA-only" seeking sponsoring models and the cooperation with funding agencies and consortia that guarantee long term financial support of OA publishing at realistic article processing fees and compatible with the efficiency and flexibility of the present system of dissemination of scientific content and metadata.

- Prof. Albrecht WAGNER, Chairman of the Board of Directors, Deutsches Elektronen-Synchrotron DESY, October 20, 2006
  DESY fully supports Open Access Particle Physics and we would like to see it realized within a short time scale. It is of great importance for DESY to be actively and constructively involved in the forthcoming discussions aiming at establishing a Sponsoring Consortium.

- Prof. Gregor HERTEN, Chair of the Commission of Particles and Fields (C11) of the International Union of Pure and Applied Physics (IUPAP), August 2, 2006
  C11 supports the transition to OA publishing, in agreement with the IUPAP mandate to guarantee free access to scientific results.