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TOWARDS OPEN ACCESS PUBLISHING IN PARTICLE PHYSICS

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Abstract. This paper, presented on behalf of the *Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP [3])* Working Party[1] is extracted from a report available online[2]. It introduces the Open Access concept and presents the strategy plus timeline proposed by the Consortium in the field of particle physics.

1. Background

The goal of "Open Access"[3] (OA) is to grant 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. The OA debate has gained considerable momentum in recent years. It is driven mostly by two factors:

– The 'serials crisis' of spiralling costs of journals subscriptions far above general inflation rates. This has forced libraries to cancel a steadily increasing number of journal subscriptions, curtailing the access of researchers to scientific literature and, in some cases, to journals in which they publish their own work. The traditional business model of access to journals through subscriptions has become financially unsustain-

[1] See the Appendix.
[2] http://cern.ch/oa/Scoap3WPReport.pdf (contact: Salvatore.Mele@cern.ch).
[3] http://oa.mpg.de/openaccess-berlin/berlindeclaration.html

able for libraries and publishers alike. In the worst case the scientific community might lose important titles which have served it well for decades.
– There is increasing awareness that the results of publicly funded scientific research should be made generally available, and not be hidden behind the toll barrier of journal subscriptions. In addition, the transformation of research towards "e-science", a global scientific community linked by strong networks, makes any artificial barriers towards scientific results less and less acceptable.

High Energy Physics (HEP) and related fields have pioneered the OA principles since a long time through the so-called "repositories", collections of "preprints" freely accessible on the Internet. The fact that today about 90% of HEP preprints is available in repositories may have made it easier for libraries to cancel expensive journal subscriptions in our field than in other branches of science.

Thanks to the speed at which they make results available, repositories have become the lifeblood of HEP scientific information. However, they typically contain articles in a preliminary format, *i.e.* the original version *submitted* to a journal, and not the final, peer-reviewed, *published* version. Also, repositories contain articles that never got 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.

2. The Importance of Journals

Notwithstanding the success of repositories, there is a consensus in the scientific community that refereed journals will continue to fulfil important functions also 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 also in future;
– 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 proposed initiative aims at building a new foundation for journal publishing through a large-scale transition of HEP journals to OA. It is based on a new business model operated in partnership with publishers, pursuing a threefold goal:

- provide open and unrestricted access to all HEP research literature in its final, peer-reviewed form, through electronic journals freely available on the Internet;
- contain the overall cost of journal publishing *e.g.* by increasing competition, while assuring sustainability;
- assert the complementary roles of repositories and journals: fast dissemination through advance versions of papers in repositories, quality control through the peer review organised by journals.

3. The Cost of Journal Publishing in HEP

Publishing a high-quality journal has a significant cost. In the era of electronic journals, the price of a journal is driven by the costs to run the peer-review system, by editorial costs for copy-editing and typesetting, by the cost for electronic publishing, and by subscription administration. Most publishers today quote a cost, from reception to final publication, in the range of €1,000-€2,000 per published article. This includes the cost of processing articles which are eventually rejected, the fraction of which varies substantially from journal to journal. Therefore we estimate that the annual budget for a transition of HEP publishing to OA would amount to a maximum of €10 Million per year. In comparison, the annual list price of a single HEP core journal today can be as high as €10,000; for 500 institutes worldwide actively involved in HEP, this represents an annual expenditure of €5 Million.

4. The SCOAP^3 Model

In the present proposal, the publishers' subscription income from multiple institutions is replaced by an "author-side" funding. Journals are paid through contracts between publishers and a single financial partner, the "Sponsoring Consortium for Open Access Publishing in Particle Physics" (SCOAP^3). SCOAP^3 is envisioned as a global network of funding agencies, research laboratories, and libraries that will contribute the necessary funding; each SCOAP^3 partner will recover its contribution from the cancellation of journal subscriptions. This model avoids the obvious disadvantage of authors being directly charged for the OA publication of their articles, which is perceived as an even higher barrier than subscription charges, in

particular for theoretical physicists from small institutions who account for the vast majority of HEP papers.

The financing and governance of SCOAP^3 will follow as much as possible the example of the memoranda of understanding governing large research collaborations. Its partners will contribute on a *pro-rata* basis according to the number of scientific publications from their country or laboratory in a reference period. To cover publications from scientists from developing countries, which cannot be reasonably expected to contribute to the consortium at this time, an allowance of not more than 10% of the SCOAP^3 budget is foreseen.

In practice, the OA transition will be facilitated by the fact that a small number of established publishers and journals account for the vast majority of HEP papers.

Almost 90% of articles submitted in 2005 to the *arXiv* repository in the categories of experimental, phenomenological and theoretical HEP, as well as lattice field theory, which were subsequently published, appeared in just six peer-reviewed journals from four publishers[4].

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 SCOAP^3 model aims to convert these core journals entirely to OA. It is expected that the vast majority of the SCOAP^3 budget will be spent on core journals.

The sixth journal, *Physical Review Letters* (American Physical Society), is a "broadband" journal which carries only a small fraction (10%) of HEP content. SCOAP^3 aims to sponsor the conversion to OA of this fraction. A similar approach holds for two other "broadband" journals in instrumentation: *Nuclear Instruments and Methods in Physics Research* (Elsevier) and *Journal of Instrumentation* (SISSA/IOP). These journals carry about 25% and 50% of HEP content, respectively.

HEP has a natural overlap with related fields such as, but not limited to, Astroparticle 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 SCOAP^3 model to these related disciplines. The fraction of broadband journals quoted above also includes publications in these related disciplines.

It is important to note that the SCOAP^3 model is not limited to this initial set of journals listed above but is open to all high-quality journals

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

concerned with HEP.

Provided that the SCOAP^3 funding partners are ready to engage into long-term commitments, most publishers could be ready to enter into negotiations along the lines proposed here.

The annual budget for the SCOAP^3 operation will be established through a tendering procedure. Among other conditions, this tender will address: the questions of access to digital archives of past journal issues; the conditions to bring OA journals out of existing subscription packages; the reduction of subscriptions for broadband journals to reflect the fraction of OA articles.

5. Benefits

The proposed model will initiate a significant shift of paradigm for the dissemination of results from scientific research, with new benefits and clearly defined roles for all stakeholders in the publication process:

- *Readers* will benefit from unrestricted access to all relevant literature in their field of research.
- *Authors* will benefit from a wider dissemination of their results, thus from better opportunities for recognition and career evolution. Their transition to OA will be transparent: they can continue to publish in the same journals as before. However, the increased visibility of their results will be a strong incentive to give preference to OA journals.
- *Publishers* will benefit from a more sustainable business model than the traditional subscription scheme, becoming increasingly fragile in the Internet era. Their prime responsibility will be to ensure quality of the highest standards through independent editorial boards and peer review. Publishers will also continue to meet demands for print subscriptions, reprints, colour plates, and other premium services, outside the scope of SCOAP^3.
- *Funding agencies* will profit from increased visibility of their research results in high-quality OA journals. They will benefit from improved stability of publication costs and possible long-term savings generated by a competitive publication market.
- *Libraries* willbenefit from solving the problem of spiraling subscription costs of HEP journals. Further, access to the published literature will be offered through library gatewayswithout barriers.

6. Timeline

We propose to start implementing the SCOAP^3 model during 2007. Leading funding agencies will pledge funds for the financial backing of the consor-

tium in April and the tendering procedure will take place during the summer. The exact budget envelope should be known by autumn. A memorandum of understanding for the governance of SCOAP^3 and the cost sharing will then be signed by the funding agencies, leading to the establishment of contracts with publishers in order to make Open Access publishing in High Energy Physics a reality at the beginning of 2008.

SCOAP^3 will be an important milestone in the history of scientific publishing. It could be rapidly generalized to other disciplines and, in particular, to related fields such as Nuclear Physics or Astroparticle Physics.

Appendix
The SCOAP^3 Working Party

Here is the composition of the SCOAP^3 Working Party: S. Bianco[a], O.-H. Ellestad[b], P. Ferreira[c], F. Friend[d], P. Gargiulo[e], R. Hanania[f], S. Henrot-Versille[g], A. Holtkamp[h], P. Igo-Kemenes[i], D. Jarroux-Declais[g], M. Jordão[c], B.-C. Kämper[j], J. Krause[f], T. Lagrange[f], F. Le Diberder[g], A. le Masurier[k], A. Lengenfelder[l], C.M. Lindqvist[f], S. Mele[f,m], S. Plaszczynski[g], R. Schimmer[l], J. Vigen[f], R. Voss[f], M. Wilbers[f], J. Yeomans[f], K. Zioutas[n],

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