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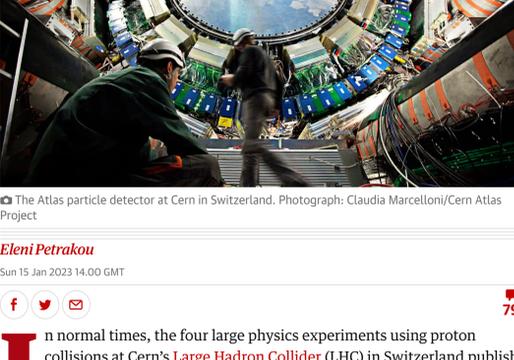
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The Observer Cern

Splitting the atomic scientists: how the Ukraine war ruined physics

At Cern and elsewhere, a reluctance to give Russian researchers authorship credit on new papers has led to stalemate



The Atlas particle detector at Cern in Switzerland. Photograph: Claudia Marcelloni/Cern Atlas Project

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In normal times, the four large physics experiments using proton collisions at Cern's **Large Hadron Collider** (LHC) in Switzerland publish numerous scientific articles a year. But in March 2022, the number of new research papers by the LHC experiments fell to zero. The reason: a lack of agreement on how to list Russian and Belarusian scientists and institutes, if at all. The temporary compromise, in place up to now, is not to publish.

Publications are the hard currency of research, used for exchange of information and evidence of individuals' and funding agencies' contributions. The four largest LHC experiments comprise collaborations of thousands of scientists and engineers, with articles typically credited to all members of the project.

According to sources at Cern, after the invasion of **Ukraine** some members objected to co-authorship with Russian institutes and even with individuals working for them (making up about 7% of the collaborators). Fedor Ratnikov, a Russian physicist, explains that no publication policy has satisfied the required two-thirds majority of the participating institutes in each collaboration. "We have Ukrainian collaborators for whom this question is naturally extremely painful. [But] most of my Ukrainian colleagues do not extend responsibility for the invasion to their colleagues from Russian institutes. I would say that some of my EU colleagues are much more radical."

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Andreas Høecker, spokesperson for the Atlas experiment, emphasises that the issue is "solely related to the form of the institutional acknowledgment, given the statements of high-level representatives of Russian academic institutions... and the links of high-level funding bodies with the Russian government".

Since March, the four LHC experiments have kept preparing new articles, sending them to journals for peer review and freezing their publication. The unpublished pipeline now includes more than 70 pieces.

Public versions are uploaded to the arXiv preprint server, but both they and the submissions to journals lack a list of authors and funding agencies. Where in the past this list would take up several pages, now there is a general attribution, eg "the Atlas collaboration".

Scientists from European countries and the US say that so far there has been little impact on funding or awarding PhDs. However, a senior scientist at the LHC from outside Europe says: "Keep this political approach for some time and it can create problems for students, postdocs and for ourselves." Brajesh Choudhary, professor at the University of Delhi and member of Cern's CMS detector experiment, says: "If you don't publish for the next few months the PhD students, postdocs and young faculty will face many problems."

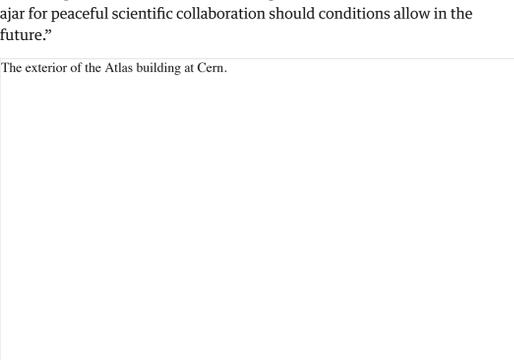
From discussions with my Russian colleagues, nobody can accept what Russia is doing in Ukraine

Fedor Ratnikov

Choudhary points out that articles without names and institutions may be acceptable within the experiments, but not by outside scientists and faculty, and that institutions care about mentions as these provide their ranking. As for the funding agencies, if they are not acknowledged, "I can tell you... that they will not react very positively."

Last spring, the Cern council decided to terminate the Russian Federation's observer status and the cooperation agreements with Belarus when they expire in two years (Ukraine is an associate member of Cern, whose regular members comprise 22 European states and Israel, with cooperation extending to several dozen countries worldwide). A Cern spokesperson says that "the measures address [the military invasion of an associate member state], which runs against the values of peaceful collaboration", adding that "the decision leaves the door ajar for peaceful scientific collaboration should conditions allow in the future."

The exterior of the Atlas building at Cern.



The exterior of the Atlas building at Cern. Photograph: Claudia Marcelloni/Cern Atlas Project

Regarding publications, at an LHC board meeting in October Cern's management acknowledged that "discussion in the collaborations is very difficult" and urged the various experiments' own boards that "authorship should be based on scientific grounds".

Ratnikov, who worked in accelerator-based experiments for American and German institutes before returning to Moscow in 2016 as a professor, believes that the halt in publications is not the biggest problem. "From discussions with my Russian colleagues, nobody can accept what Russia is doing in Ukraine. They just continue doing their job: doing scientific research, teaching students... [We] have this negative pressure at Cern in spite of many years, sometimes a significant part of [a scientist's] life, spent for the success of Cern experiments."

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According to John Ellis, a professor at King's College London and veteran theoretical physicist at Cern: "Russians working at Cern are covered by international cooperation agreements. If these collapse, then there is no legal basis for them to work in Switzerland and yet some have signed open letters protesting [against] the war." He explains that the termination of observer status in 2024 provides coverage until then, in the hope of a permanent diplomatic solution, but calls for the overall "protection of the scientists".

Although unique, the case of the LHC experiments is part of a wider trend. The German Research Foundation **has warned scientists against publishing** with co-authors from Russian institutes. The Web of Science database tracking citations **has stopped evaluating articles** from Russia. **There have been reports** of individual peer-review referees rejecting articles. And as Russian institutes are getting excluded from international projects, some fields see a direct impact - such as climate change research, which **is being set back** by the suspension of collaboration in the Arctic.

In a **letter** published in *Science* last spring, five prominent western scientists urged colleagues not to "abandon Russian scientists". One of them, Nina Fedoroff, emeritus professor of biology at Pennsylvania State University, says that "some of [the situation] seems pretty symbolic". In her opinion, science diplomacy "can sort out the bad actors from the good actors, but we do much less of it through official channels than we could be doing."

As for the LHC stalemate, people at Cern point to a solution implemented at the Belle II particle physics experiment in Japan. Belle II began listing authors with their institute affiliations in replaced by their Orcid (open researcher and contributor ID), an identification scheme widely used in physics research that connects authors to their institutions. However, the Polish government reportedly objected to this tactic, not accepting the explicit omission of Polish affiliations. The issue is still up in the air.

As the international particle physics community finds itself in an uncommon limbo, for scientists such as Ellis, "Maintaining scientific collaboration is top priority, as a great way of bringing nations together to solve humankind's problems." Or, as Fedoroff notes: "During the so-called cold war, interactions among Russian and American physicists and between the physicists and their respective governments were credited for keeping the war cold."

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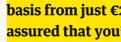
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