



IUPAP

*International Union of
Pure and Applied Physics*

CII

Commission of Particles and Fields

Assessment of Individual
Achievements in Large Collaborations
in Particle Physics

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Assessment of Achievement: Background

Experiments in particle physics involve world-wide collaborations of many scientists.

The detectors are designed, constructed and operated by large research groups and the scientific results are a common achievement of many scientists. The time required from the first idea about the experiment, design, construction to data taking and data analysis span more than ten or twenty years.

The continuous contributions of all participants – experts in detector hardware, calibration and data analysis alike – are essential for publishing scientific results.

In experimental particle physics publications are usually signed by many authors in alphabetic order.

The assessment of scientific achievements based mainly on publication lists is no longer applicable in experimental particle physics. More factors must be included to judge the scientific merits of individual researchers in this field.



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Assessment of achievements

- Particle Physics needs a catalogue of objective criteria, transparent to people outside of the field for the assessment of individual achievements in large collaborations.
 - for decision makers at universities, laboratories, prize committees.
 - for experiments: to adapt their procedures to allow excellent physicists to obtain a track record, which is understood outside of Particle Physics.
 - for young particle physicists: to have a bench mark for their scientific work.
 - for Particle Physics group leaders: to convince colleagues in other fields.



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WG: Assessment of scientific achievements

- CII created a Working Group to address the issue of individual scientific achievement.
- The WG included participation of major experiments in particle physics.
- The first meeting was held during the Lepton Photon LP07 Conference in Daegu.
- The group met by phone and email throughout the past year and held another F2F meeting at ICHEP08 in Philadelphia.
- After consulting with the collaborations, a report was released and is available on the CII web site.



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CII Working Group: Goals

- The primary goal of the WG was to define a set of **common measures** to enhance the visibility of individual achievements while maintaining the successful collaborative spirit in large collaborations in particle physics.
- These criteria should be transparent to decision makers outside of the large collaborations, such as at universities, laboratories and prize committees.

Along the way, the collaborations were invited to give input and to comment on a draft version of the final report through their WG representatives.

The recommendations for common measures are included on the following slides.



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CII Working Group

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Proposed measures

- **Eligible authors**

The Collaborations shall have clear internal rules regarding who is an eligible author for each publication. The rules shall be public and transparent and follow the guideline that “authorship should be limited to those who have made a significant contribution to the concept, design, execution and interpretation of the research study. All those who have made significant contributions should be offered the opportunity to be listed as authors.” (See, as an example: American Physical Society Guidelines for Professional Conduct).

- **Publication Web page**

For each publication the collaboration might release a public web page with supporting notes and details about the individual contributions in analysis, operation, calibration, computing, editorial, etc., which have been essential for the publication.

- **Most relevant publications**

Rather than a list of all publications, one finds often in the curriculum vitae of experimental particle physicists a list of “most relevant publications.” This could be an indicator for scientific merit if the criteria for “most relevant publications” are clearly defined and similar in all collaborations. A good criterion for including a publication in this list could be the appearance of the individual as a significant contributor on the publication web page of the collaboration.



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Proposed Measures (2)

- **Scientific and technical notes**

Scientific and technical notes, published by a few authors in an internally or externally refereed form, could help to make individual contributions more visible. These notes can describe in more detail the detector development, operation and calibration, as well as reconstruction algorithms, analysis techniques and statistical methods.

- **Public track record**

Collaborations should keep a public track record of authorship of refereed internal notes (listed with author names and titles of the notes), nominated speakers for conferences, responsibilities and positions inside the collaboration (with an explanation about the scientific merits required for this task), contributions to the operation of the experiment, membership in editorial boards, and other positions of responsibility.

- **Two-tier author list**

Collaborations could consider the use of a two-tiered author list to emphasize special contributions to publications. One option is to list a group of "main authors", another option is to keep the alphabetical order but mark some names as principal authors.



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Proposed Measures (3)

- Awards

Awards are an important measure to make individual achievements in large collaborations known to outside people. More use should be made of awards in particle physics: HEP-wide prizes, awards in countries, laboratories and universities as well as inside collaborations to acknowledge the scientific achievements of scientists (e.g., for PhD theses, data analysis, detector development, detector operation and calibration).

Note that C11 has established a new prize for Young Scientists:
<http://www.interactions.org/cms/?pid=1026217>

The first awards were presented at ICHEP 08:

Yasaman Farzan (Institute for Research in Fundamental Sciences, Teheran) and Kai-Feng Chen (National Taiwan University, Taipei).



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Conclusions and Recommendations

The IUPAP Commission C11 encourages the collaborations in particle physics to agree to this common set of criteria and measures and to adapt their internal procedures accordingly while recognizing that the final decision rests with each collaboration.

Decision makers in selection, promotion and prize committees at universities and science organizations should use these established criteria to assess the achievements of particle physicists and compare them to scientists in other fields.

This catalogue of criteria could be also used in other fields of science, where large collaborations are required to achieve results.



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More information

- International Union of Pure and Applied Physics C I I
Commission: <http://www.iupap.org/commissions/c I I/>
- Working Group Report: <http://www.iupap.org/commissions/c I I/reports/wg-assessment-08.pdf>