



Contribution ID: 253

Type: **Parallel Talk**

The challenge of explaining new physics concepts and phenomena

Saturday 8 July 2017 10:45 (15 minutes)

With the advent of higher energies and higher collision rates the LHC continues the exciting voyage towards new physics, allowing physicists all over the world to explore a previously unknown territory full of promise.

So far the IPPOG international masterclass developers, with the help of physicists and in close contact with teachers, have been successful in designing educational material and in engaging high school students to work, with real LHC data, on current hot topics, such as the discovery of the Higgs boson.

One of the current challenges is to convey advanced physics concepts and to introduce new ideas beyond today's theoretical framework describing the content of the Universe and its evolution. How can we influence the teaching at schools in order to provide a better basis for attending masterclass-like events, and in general for understanding experimental results and new theoretical ideas?

An IPPOG initiative deals with effective ways of explaining new physics. Moreover, physicists, in close contact with high school teachers and university departments of education, are investigating a more professional and research-based view on methods and ideas for introducing and explaining new physics concepts. A program plan together with relevant material must be created and incorporated to suit the high school curriculum and even replace the ordinary text book on the subject.

This talk will suggest how educational material could be improved and extended to cover crucial topics and concepts and to better accommodate real learning at the Masterclasses and similar events, and to facilitate the understanding of new results as they keep streaming from the LHC and other current and future research instruments. This is crucial in explaining new physics concepts and related enigmas such as dark matter, the role of gravity at the quantum scale, the possible unification of all fundamental forces and the physics of the early Universe.

Experimental Collaboration

IPPOG

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Session Classification: Outreach, education, diversity

Track Classification: Outreach, Education, and Diversity