Exploring Elementary Particles at the LHC - A Look at Recent Results and into the Future

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The talk will provide insight to elementary particle physics at the Large Hadron Collider and the CMS Experiment and will describe their fascinating physics results at present as well as the prospects for the future.

The Large Hadron Collider (LHC) began its first routine proton-proton collision operation in 2010 lasting until 2012. Already mid of 2012 a major discovery could be announced: a candidate for the so-called Higgs Boson, searched for since more than four decades, had been identified and meanwhile confirmed. In 2013 and 2014 the collider and the experiments were consolidated and substantially upgraded in view of the new data taking at almost twice the collision energy and with increasing beam intensities. This new era of Run 2, where novel territories for particle physics are opened, began mid of June 2015. All detectors of the CMS Experiment demonstrated excellent performance and first physics results could be shown and published already end of July. The Physics Jamboree at the end of the year has seen in total 33 brand-new results. Highlights of these new results in terms of searches for new physics and unknown particles as well as unprecedented precision measurements will be shown. The prospects for even more exciting results in future are bright: the physics program of the collider and the experiments will last at least until 2035 with even higher and very ambitious beam intensities. The major components of envisaged upgrades to prepare the CMS Experiment for this challenge will be briefly outlined.