

CERN has 2020 vision for LHC upgrade

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CERN today kicked off the High Luminosity LHC study with a [workshop](#) bringing together scientists and engineers from some 14 European institutions, supported through the European Commission's seventh Framework programme (FP7), along with others from Japan and the USA. The goal is to prepare the ground for an LHC luminosity upgrade scheduled for around 2020. Luminosity gives a measure of the collision rate in a particle accelerator and therefore gives an indication of its performance.

The LHC already delivers the highest luminosity beams of any high energy proton accelerator in the world, which is vitally important for physicists wanting to study extremely rare processes.

“With the LHC colliding hundreds of millions of particles each second, some of the processes we're interested in will happen just a few times a day” explained [CERN](#) Research Director Sergio Bertolucci, “with processes so rare, extra luminosity makes a big difference to our ability to make precision measurements and discover new things.”

This week's workshop launches the initial design phase of the project, which aims to take the LHC's luminosity to a factor of 5-10 above its current design value. It draws on expertise from around the world, bringing together scientists from the well-established CERN-KEK collaboration and US LHC Accelerator Research Program (LARP) with a new European Design Study supported under FP7. This international nature is representative of the field of particle physics, and vital for its success of the project.

“We have set up a collaboration in which all partners are involved at the same level,” said High Luminosity LHC project coordinator, Lucio Rossi. “While we were building and commissioning the LHC, LARP and KEK were developing new technologies for the next generation magnets. Their research and development activities will be key to our success.”

Upgrading the LHC for higher [luminosity](#) will require new technologies to be developed in a range of fields including high field magnets, radiofrequency cavities and electrical transfer lines . All these new components are based on superconducting technology.

“All these new technologies require further study but the project’s partners have the necessary know-how to successfully develop them,” explained Rossi. “At the kick-off meeting we will synchronize our work to increase synergies among the partners, touching base on what has been done so far and define future milestones.”

More information: Anyone wishing to get involved with the High Luminosity LHC study can do so through the volunteer computing project, LHC@home: cern.ch/LHCathome/

Provided by CERN

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