

KEK Celebrates the Groundbreaking of SuperKEKB Project

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More than 200 physicists, government officials and representatives from around the world gathered at KEK (the High Energy Accelerator Research Organization), Japan, to celebrate the official groundbreaking ceremony of SuperKEKB, the next generation electron-positron collider experiment.

The ceremony was held on November 18 at Kobayashi Hall. KEK Director General Atsuto Suzuki addressed the project as an important milestone toward the understanding of new physics in high intensity beams; the project will be conducted in a complementary role to the experiments being carried out at the energy frontier by the Large Hadron Collider (LHC) project at CERN.

KEK has operated the previous project, KEK B-Factor (KEKB), from 1998 to 2010. KEKB's electron-positron collider has achieved the world's highest luminosity, which is an index to measure the rate of the collisions between electron and positron beams. KEKB's Belle experiment, conducted at the interaction point of the electron and positron beams, precisely analyzed the characteristics of pairs of B and anti-B mesons produced by those collisions and confirmed the effect of charge-parity violation as indicated by Kobayashi-Maskawa theory. Both Professor Kobayashi and Professor Maskawa received



the Nobel prize in physics in 2008.

SuperKEKB is an upgrade project to increase the luminosity by forty-times greater than that of the already successful KEK B-Factor. The goal of the project is to search for clues of new physics beyond the "Standard Model." "With forty times more B meson samples, roughly 800 pairs per second, we will be able to examine the effects of unknown particles at higher energy regions," explains Peter

Krizan, Professor at the University of Ljubljana, Slovenia, and the spokesperson of the new collaboration Belle II. "This collaboration will be one of the international focal points for particle physics in the next decade."

To gain forty times more luminosity, the accelerator must achieve twice as high beam currents, and twenty times denser electron and positron bunches. Various parts of the KEKB accelerator will be replaced or newly installed, such as a new dumping ring, a new shape for the positron beam pipe, newly designed

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dipole magnets and new radio-frequency power supplies. The Belle II detector will also have upgrades: a highly parallel data processing system, a new pixel solid state detector and new Cerenkov detectors. More than 400 physicists from 61 institutions from 17 countries and regions have joined together to form the collaboration.

The first beam of SuperKEKB is expected in JFY 2014, and the physics run will start in JFY 2015.

The speech by Peter Krizan was followed by remarks by Hiroaki Aihara, Professor at the University of Tokyo and Belle II Executive Board Chair; Takao Kuramochi, Director General, Research Promotion Bureau, MEXT; Michael Procario, Director, Facilities Divisions, Office of High Energy Physics, DOE; and Takashi Tachibana, a prominent Japanese journalist. These speakers were followed by video messages

from Rolf Heuer, Director General, CERN; Piermaria Oddone, Director, Fermilab; and Young-Kee Kim, Deputy Director, Fermilab.

The ceremony was concluded by remarks by Katsunobu Oide, Director, Accelerator Laboratory, KEK, and a Daruma doll ceremony. The Daruma doll ceremony is a traditional Japanese ritual. Daruma dolls are typically sold with blank pupils. At the advent of a project, one pupil of one of the eyes of the Daruma doll is drawn. The second pupil is only to be drawn after the project has been successfully completed. Thus, one works toward having “both eyes open,” which, in other words, is the accomplishment of one’s intended goal. This ceremony symbolized the hope that aspirations of this project will be achieved.

