

# 2011 IPMU-YITP School and Workshop on Monte Carlo Tools for LHC

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The 2011 IPMU-YITP School on Monte Carlo Tools for LHC was held for the first time outside Europe, at the Yukawa Memorial Hall of Kyoto University, on September 5-10, 2011. This series of schools has been annually organized by a group developing crucial computational tools for analyzing the physics of LHC experiments. Kyoto was selected as the main venue because, at the time of planning, there were non-negligible effects of the great earthquake on March 11, 2011. As the school was held in Asia, about 80% of the 50 students who participated were from Japan, China, India, and Korea.

The purpose of this school is to familiarize students with the why, what, and how of the tools with which one can compute various physical processes occurring in the LHC experiments aiming at exploring the ultimate structure of elementary particles. Using these tools it is possible not only to compute particle production rates at LHC, but also to simulate interactions occurring at LHC and to look into them in detail. In recent years, better agreements have been obtained between the computed results and the experimental data by taking higher order QCD corrections more strictly into account. Typically these tools are utilized for physics studies in the LHC experiments which have high background event rates.

At the school, together with a series of lectures,



students ran these computational codes for training of simulations and analyses of real LHC events. Within a week they experienced all of Herwig<sup>++</sup>, PYTHIA, and Sherpa, which are the main codes to produce the Standard-Model processes at LHC. They also got MadGraph training, with which they can incorporate interactions and generate events in physics beyond the Standard Model. There were about 10 lecturers and tutors for 50 students. Software installation was efficiently performed on the pre-installed VirtualBox virtual computer. Through a questionnaire survey carried out after the school, it was observed that the students were very satisfied. This school was effective for Asian students who had no access to Monte Carlo tools so far to explore the exciting physics of the LHC experiments from now on.