

Report of the activity during my stay in Cuba

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In the framework of HELEN project I visited the Cuban group involved in the project for a period of three months from July 27th to October 24th of 2006 in the “Centro de Aplicaciones Tecnológicas y Desarrollo Nuclear” (CEADEN), Ciudad Habana.

My research activity during this period consisted in the study and development of the software needed for the simulation and analysis of the physics processes expected in the ALICE experiment at LHC in proton-proton collisions. This software is currently being developed by the ALICE off-line group in a object-oriented framework called AliRoot. In AliRoot, simulated data are generated via Monte Carlo event generators. The generated tracks are then transported through the detector via detector simulation packages as GEANT3, FLUKA and GEANT4. These packages generate a detailed energy deposition in the detector, which is consequently transformed in a detector response, taking into account the electronic manipulation of the signals. The reconstruction algorithms reconstruct the information about particle trajectory. This software, used to study the detector performance is now being adapted to reconstruct real data.

During my visit in Cuba I firstly learned how to run a simulation and to reconstruct the tracks, setting the configuration file for a p-p collision and activating the only Inner Tracking System (ITS) for the reconstruction because the aim of my work was to study the vertex of the interaction. The second step was to understand the vertexer algorithm of AliRoot and, at the end, to adapt it to discover the presence of more than one vertex and to determine their position. To achieve the aim I simulated a big amount of single (i.e. with one vertex) events and then I merged them in couples to simulate double events (i.e. with two vertices) on which I studied the behaviour of the vertexer. I needed some typical value in the two cases to elaborate the new vertexer so I used the sample of simulated events to study the characteristics of single and double events in respect to the determination of the vertex. The low statistic of the p-p collision often hinders the reconstruction of the tracklets making useless a great deal of interactions and uncertain the parameters founded with them. For this reason the task I dealt with in Cuba is the first step of a more extensive work to be continued in collaboration with the researchers of the University of Torino.

About HELEN project in general, I think it's a great opportunity for

students because it makes them establish contact with the career they're going to take up and with the culture and the language of a foreign country. My tutor as all the workers of the CEADEN and my host family were very friendly and on hand so I could enjoy very much my staying.