



Contribution ID: 8

Type: **not specified**

THE FUTURE MACHINES IN PROJECT FOR CONFRONTING THE FUTURE OF PARTICLE PHYSICS

Thursday 23 May 2019 18:30 (2 hours)

!! THIS IS THE MOST IMPORTANT TOPIC IN THE HIGH ENERGY WORLD !!
WHAT ARE THE NEXT MACHINES TO BE BUILT FOR EXPLORING and EXPLAIN THE ELEMENTARY
PARTICLE WORLD MUCH BEYOND WHAT HAS BEEN ALREADY DISCOVERED??
These are WORLDWIDE & INTERNATIONAL PROJECTS for the next 50 or more years to come.
The accelerators of particles in project in the world, China, Europe and Japan will be presented, with their
Physics reach as well as their Physics and Technological Challenges, by international experts. These projects
include:

- The electron-positron linear colliders; two such colliders in project:
 - 1) the ILC (International Linear Collider) at 250 GeV in c.m.s. in Japan (see abstract by Prof. Hitoshi Hayano). Five Technical Design Reports describe in details the whole project.
 - 2) CLIC (Compact Linear Collider) at CERN (CH) first at 380 GeV, then 1.5 TeV and up to 3TeV. Four Conceptual Design Reports (CDR) describe the Machine, Detectors and Physics of this project.
- Two combined e+e- and pp colliders in project:
 - 1) the CepC/SppC project in China aiming to build a 100 kms long circular machine. This machine will be in a first stage an electron-positron collider, running at 90, 160 and 250 GeV (Z, W factory, Higgs Factory, Flavor factory).The CepC is expected to run towards end of 2030.
In a second stage of this project, the circular tunnel is used as a proton-proton collider running at about 100 TeV center of mass energy.
 - 2) The FCC (Future Circular Collider) in Europe (to be based at CERN) implemented as FCCee, an e+e-circular collider (from 90 to 365 GeV) and then implemented as a 100 TeV pp collider, FCC will also provide the possibility of an electron-hadron collider. The FCCee machine would start running after the end of the High Luminosity era of the LHC (HL-LHC), i.e. towards 2038.
Both CepC-SppC and FCC have produced detailed Conceptual Design Reports (CDR) describing the Machine, Detectors and Physics at the end of 2018. Needless to stress how much these projects are extremely challenging. They explore different ways in the most tricky R&D aspects of these machines, especially the magnets.

“It’s a huge leap, like planning a trip not to Mars, but to Uranus,” says Gian Francesco Giudice, who heads CERN’s theory department and represents the laboratory in the Physics Preparatory Group of the strategy update process.”

“It’s too early to say this is a competition. I think it’s good to have different proposals and to explore the advantages and disadvantages of each proposal thoroughly. Then we can see which one is more feasible, and the community will decide.” says Prof. Yifang Wang in an article on Nature January 2019.

The lecturers are;

- Prof. Joao GUIMARAES DA COSTA (IHEP, CAS, CN) for the Circular Electron Positron Collider, CEPC project
- Dr Michelangelo L. MANGANO (CERN, CH) for the Future Circular Collider, FCC project.

- Prof Hitoshi HAYANO (KEK-Japan) for the International Linear Collider, ILC Project (see abstract here attached).
 - Prof. Aidan ROBSON (Glasgow University & CERN) for the Compact Linear Collider, CLICdp Project.
- These presentations were followed at the end by a Q&A session.

Presenters: Prof. ROBSON, Aidan (University of Glasgow (GB)); Prof. HAYANO, Hitoshi (KEK-Japan); Prof. GUIMARAES DA COSTA, Joao (Chinese Academy of Sciences (CN)); Prof. MANGANO, Michelangelo (CERN)

Session Classification: EVENING KEYNOTE