Contribution ID: **9** Type: **not specified**

Search for 4th generation fermions: Motivation, status and prospects

Tuesday 15 September 2009 09:00 (55 minutes)

Current data do not exclude the existence of an additional sequential 4th generation of leptons and quarks. Such a natural extension of the standard model content has some interesting features: the possibility of gauge coupling unification without supersymmetry, a possible particular role of such particles in electroweak symmetry breaking and a sufficiently large amount of CP violation for baryogenesis.
Constraints on mass differences between these hypothetical new particles are provided by the electroweak precision fit. Direct mass limits have been obtained at LEPI/II and the Tevatron. Constraints on mixing matrix elements have been discussed in the literature. A complete and consistent picture, however, is still missing.
The LHC offers a unique opportunity to look for 4th generation fermions. In case of a discovery there will be important consequences for the Higgs phenomenology and we expect also indirect signals in flavour physics.

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Session Classification: A Fourth Generation of Fermions