

Beyond the 3SM generation at the LHC era Workshop

Report of Contributions

Contribution ID: 0

Type: **not specified**

The strong case for new flavor physics

Thursday 4 September 2008 09:30 (30 minutes)

Author: Prof. HOLDOM, Bob (Univ. Toronto, Canada)

Presenter: Prof. HOLDOM, Bob (Univ. Toronto, Canada)

Session Classification: Introduction and Motivation

Contribution ID: 1

Type: **not specified**

Why the 4SM families - 2008

Thursday 4 September 2008 10:00 (30 minutes)

Author: Prof. SULTANSOY, Saleh (TOBB University of Economics and Technology)

Presenter: Prof. SULTANSOY, Saleh (TOBB University of Economics and Technology)

Session Classification: Introduction and Motivation

Contribution ID: 2

Type: **not specified**

Source of CPV for Baryon Asymmetry of the universe

Thursday 4 September 2008 10:30 (30 minutes)

Author: Prof. HOU, George (NTU)

Presenter: Prof. HOU, George (NTU)

Session Classification: Introduction and Motivation

Contribution ID: 3

Type: **not specified**

Experimental Constraints on fourth generation quark masses

Thursday 4 September 2008 11:00 (30 minutes)

The existing bounds from CDF on the masses of the fourth generation quarks, t' and b' , are reexamined. The bound of 256 GeV on the t' mass assumes that the primary decay of the t' is into $q+W$, which is not the case for a substantial region of parameter space. The bound of 268 GeV on the b' mass assumes that the branching ratio for $b' \rightarrow b+Z$ is very large, which is not only not true for much of parameter space, but is never true for b' masses above 255 GeV. In addition, it is assumed that the heavy quarks decay within the silicon vertex detector, and for small mixing angles this will not be the case. The experimental bounds, including all of these effects, are found as a function of the other heavy quark mass and the mixing angle.

Author: Prof. SHER, Marc (WMU)**Presenter:** Prof. SHER, Marc (WMU)**Session Classification:** Introduction and Motivation

Contribution ID: 4

Type: **not specified**

Fourth family and the silver mode of Higgs search

Thursday 4 September 2008 16:25 (25 minutes)

Author: CUHADAR DONSZELMANN, Tulay (Department of Physics and Astronomy-University of Sheffield)

Presenter: CUHADAR DONSZELMANN, Tulay (Department of Physics and Astronomy-University of Sheffield)

Session Classification: Impact on Higgs Searches

Contribution ID: 5

Type: **not specified**

Fourth SM Family and Higgs at Hadron Colliders

Thursday 4 September 2008 16:00 (25 minutes)

Author: CETIN, Serkant Ali (Dogus Univ., Istanbul)

Co-authors: Prof. ARIK, Engin / 1948-2007 (Bogazici Univ., Istanbul); Prof. CAKIR, Orhan (Ankara Univ.); Prof. SULTANSOY, Saleh (TOBB ETU, Ankara & Inst. of Phys., Baku)

Presenter: CETIN, Serkant Ali (Dogus Univ., Istanbul)

Session Classification: Impact on Higgs Searches

Contribution ID: 6

Type: **not specified**

D0 Higgs searches and the 4th family

Thursday 4 September 2008 15:30 (30 minutes)

Author: HAAS, Andy (Columbia)

Presenter: HAAS, Andy (Columbia)

Session Classification: Impact on Higgs Searches

Contribution ID: 7

Type: **not specified**

b' searches at Tevatron

Thursday 4 September 2008 13:00 (25 minutes)

Author: Dr DEMINA, regina (university of rochester)

Presenter: Dr DEMINA, regina (university of rochester)

Session Classification: Direct searches (Tevatron & LHC)

Contribution ID: 8

Type: **not specified**

A holographic fourth generation: signals at the LHC

Friday 5 September 2008 09:30 (20 minutes)

I present a model with four generations of standard model fermions propagating in a five-dimensional AdS metric. I show that it is possible to break the electroweak symmetry via the condensation of the fourth generation, driven by their interactions with the Kaluza-Klein gauge bosons and by the presence of bulk higher-dimensional operators. This dynamical mechanism results in a heavy composite Higgs, which is highly localized towards the infrared boundary. The localization of the fermions in the five-dimensional bulk naturally leads to the standard model Yukawa couplings via the action of the bulk higher-dimensional operators. I show the spectrum of the model and discuss the electroweak precision constraints. I also study the production and detection of the fourth generation as well as the gluon resonances at the LHC.

Author: Dr DA ROLD, Leandro (Instituto de Fisica - Universidade de Sao Paulo)

Presenter: Dr DA ROLD, Leandro (Instituto de Fisica - Universidade de Sao Paulo)

Session Classification: Other LHC aspects

Contribution ID: 9

Type: **not specified**

4th family searches with ATLAS

Thursday 4 September 2008 13:50 (25 minutes)

We present a study for the search of 4th generation quarks at the LHC

Author: OZCAN, Erkcan (University College London)

Presenter: OZCAN, Erkcan (University College London)

Session Classification: Direct searches (Tevatron & LHC)

Contribution ID: **10**

Type: **not specified**

b' searches in CMS

Thursday 4 September 2008 14:15 (25 minutes)

Author: CHAO, Yuan (National Taiwan University (NTU))

Presenter: CHAO, Yuan (National Taiwan University (NTU))

Session Classification: Direct searches (Tevatron & LHC)

Contribution ID: 11

Type: **not specified**

Additional quark searches with CDF

Thursday 4 September 2008 13:25 (25 minutes)

Presenter: Dr LISTER, Alison (UC Davis)

Session Classification: Direct searches (Tevatron & LHC)

Contribution ID: 12

Type: **not specified**

Interactions of Heavy Exotic Hadrons

Friday 5 September 2008 09:50 (20 minutes)

The search for stable heavy exotic hadrons is a promising way to observe new physics processes at collider experiments. The discovery potential for such particles can be enhanced or suppressed by their interactions with detector material. This paper describes a model for the interactions in matter of stable hadrons containing an exotic quark of charges $\pm 1/3e$ or $\pm 2/3e$ using Regge phenomenology and the Quark Gluon String Model. The influence of such interactions on searches at the LHC is also discussed.

Author: Dr MILSTEAD, David (Fysikum)**Presenter:** Dr MILSTEAD, David (Fysikum)**Session Classification:** Other LHC aspects

Contribution ID: 13

Type: **not specified**

Anomalous Resonant Production of the fourth family quarks at the LHC

Friday 5 September 2008 10:10 (20 minutes)

Considering the present limits on the masses of fourth family quarks from the Tevatron experiments, the fourth family quarks are expected to have mass larger than the top quark. Due to their expected large mass they could have different dynamics than the quarks of three families of the Standard Model. The resonant production of the fourth family t' and b' quarks are studied via anomalous processes $gq_i \rightarrow t'$ and $gq_j \rightarrow b'$ (where $q_i = u, c$ and $q_j = d, s, b$) at the LHC. The signatures of such processes are discussed within the SM and anomalous decay modes. The sensitivity to anomalous coupling κ/Λ can be reached down to 0.01 TeV⁻¹.

Author: ÇAKIR, Orhan (University of Ankara)

Presenter: ÇAKIR, Orhan (University of Ankara)

Session Classification: Other LHC aspects

Contribution ID: **14**

Type: **not specified**

Electroweak radiative corrections and extra generations

Friday 5 September 2008 13:20 (25 minutes)

Fit of precision electroweak data allows the existence of the fourth quark-lepton generation. If the latter exists then Higgs boson might be heavy.

Author: Prof. VYSOTSKY, Mikhail (ITEP)

Presenter: Prof. VYSOTSKY, Mikhail (ITEP)

Session Classification: Precision physics I

Contribution ID: 15

Type: **not specified**

CPV in $b \rightarrow s$ and $b\bar{s}$ - $s\bar{b}$ transitions

Friday 5 September 2008 14:05 (20 minutes)

Author: HOU, George Wei-Shu (National Taiwan University (NTU))

Presenter: HOU, George Wei-Shu (National Taiwan University (NTU))

Session Classification: Precision physics I

Contribution ID: 17

Type: **not specified**

Dark matter from new stable quarks and leptons

Friday 5 September 2008 10:50 (20 minutes)

Heavy stable charged particles can exist, hiding from us in bound atomlike states. Models with new stable charged leptons and quarks, giving rise to realistic composite dark matter scenarios, are reviewed.

Author: Prof. KHLOPOV, Maxim (MEPhI and VIA/APC/CNRS)

Presenter: Prof. KHLOPOV, Maxim (MEPhI and VIA/APC/CNRS)

Session Classification: Astroparticle & Cosmology

Contribution ID: 18

Type: **not specified**

Model of Electroweak scale active right-handed neutrinos, its extension and phenomenological implications

Friday 5 September 2008 11:10 (25 minutes)

Electroweak scale active right-handed neutrinos can be directly produced at the LHC with characteristic signatures such as like-sign dileptons. Accompanying this is a rich Higgs structure such as doubly charged scalars which can also be probed at the LHC. The Pati-Salam extension of the model contains keV sterile neutrinos with astrophysical implications and it is suggested how a fourth family can fit snugly in this framework.

Author: Prof. HUNG, P.Q. (Virginia)

Presenter: Prof. HUNG, P.Q. (Virginia)

Session Classification: Astroparticle & Cosmology

Contribution ID: 19

Type: **not specified**

On the origin of families and their mass matrices with the approach unifying spins and charges, prediction for the fourth family and the dark matter family

Friday 5 September 2008 11:35 (20 minutes)

The approach unifying all the internal degrees of freedom—the spins and all the charges into only (two kinds of) the spin—is offering a new way of understanding the properties of quarks and leptons, that is their charges and their couplings to the gauge fields, the appearance of families and their mass matrices. The (simple) starting Lagrange density for spinors in $d=1+3$, which carry nothing but two kinds of spins—the Dirac kind and the additional one, commuting with the Dirac one (no charges) and interact with only the gravitational field through vielbeins and two kinds of spin connection fields—the gauge fields of the two kinds of the Clifford algebra objects—manifests in $d=1+3$ the properties of fermions and bosons as postulated by the Standard model of the electroweak and colour interactions, with the Yukawa couplings included. In this talk a way of spontaneous breaking of the starting symmetry which leads to the properties of the observed fermions is presented and rough predictions for not yet measured fermions is made, with the dark matter candidates included. The prediction is made that the fourth family will possibly be measured at LHC. The estimation is made that a cluster of the fifth family could be measured at new experiments with NaI.

Author: Prof. MANKOC BORSTNIK, Norma Susana (University of Ljubljana, Fac. for Math. and Phys.)

Presenter: Prof. MANKOC BORSTNIK, Norma Susana (University of Ljubljana, Fac. for Math. and Phys.)

Session Classification: Astroparticle & Cosmology

Contribution ID: **20**

Type: **not specified**

New Physics Search at B Factory

Friday 5 September 2008 15:30 (25 minutes)

Author: Dr CHANG, Paoti (NTU)

Presenter: Dr CHANG, Paoti (NTU)

Session Classification: Precision physics II

Contribution ID: 21

Type: **not specified**

Constraints on the quark and lepton mixing matrices from a few simple constraints within a fourth generation scenario

Friday 5 September 2008 13:45 (20 minutes)

With the LHC start ahead new interest in the existence of a possible fourth generation of quarks and leptons came up recently. We point out that in the recent literature a few useful constraints on the fourth generation CKM and PMNS matrix elements have not been fully appreciated and we discuss their correlated impact of these constraints on the quark and lepton mixing matrices.

Author: Prof. LACKER, Heiko (Berlin, Humboldt University)

Presenter: Prof. LACKER, Heiko (Berlin, Humboldt University)

Session Classification: Precision physics I

Contribution ID: 22

Type: **not specified**

A 4th generation scenario

Thursday 4 September 2008 17:10 (15 minutes)

Author: Dr RICHARD, Francois (LAL)

Presenter: Dr RICHARD, Francois (LAL)

Session Classification: Prospects for future colliders

Contribution ID: 23

Type: **not specified**

Lepton Colliders & The fourth family

Thursday 4 September 2008 17:25 (15 minutes)

Author: SULTANSOY, Saleh (TOBB University of Economics and Technology)

Presenter: SULTANSOY, Saleh (TOBB University of Economics and Technology)

Session Classification: Prospects for future colliders

Contribution ID: 24

Type: **not specified**

LHCb : tree and tree+penguin decays: $B_s \rightarrow J/\psi \phi$, and $B \rightarrow hh, 3h$

Friday 5 September 2008 15:55 (20 minutes)

Author: Dr VAGNONI, Vincenzo (INFN Bologna)

Presenter: Dr VAGNONI, Vincenzo (INFN Bologna)

Session Classification: Precision physics II

Contribution ID: 25

Type: **not specified**

LHCb: penguin decays: $B_s \rightarrow \phi \phi$, $\phi \gamma$, $\phi \mu \mu$, $B_d \rightarrow K^* \mu \mu$

Friday 5 September 2008 16:15 (20 minutes)

Rare loop induced decays of neutral B mesons are sensitive probe of NP. The reconstruction of the decays $B_s \rightarrow \phi \phi$, $\phi \gamma$, $\phi \mu \mu$, $B_d \rightarrow K \gamma$ and $K \mu \mu$ at the LHCb experiment will be discussed. The measurement of some observables sensitive to lepton generations beyond the SM, such as the CPV in the radiative penguins, the forward-backward asymmetry in the $B_d \rightarrow K^* \mu \mu$ and the CPV in the decays $B_s \rightarrow \phi \phi$, $B_s \rightarrow \phi \mu \mu$ will also be presented.

Author: SERRA, Nicola (NIKHEF)

Presenter: SERRA, Nicola (NIKHEF)

Session Classification: Precision physics II

Contribution ID: 26

Type: **not specified**

$\sin^2 \beta_s$ status from CDF

Friday 5 September 2008 16:35 (25 minutes)

Author: Dr FERNANDEZ, Juan Pablo (CDF)

Presenter: Dr FERNANDEZ, Juan Pablo (CDF)

Session Classification: Precision physics II

Contribution ID: 27

Type: **not specified**

The fourth family: a natural explanation for the observed pattern of anomalies in B-CP asymmetries

Friday 5 September 2008 17:00 (25 minutes)

Author: Dr SONI, Amarjit (BNL)

Presenter: Dr SONI, Amarjit (BNL)

Session Classification: Precision physics II

Contribution ID: 28

Type: **not specified**

CDF (TBD)

Contribution ID: 29

Type: **not specified**

Babar Results

Friday 5 September 2008 15:05 (25 minutes)

Author: Dr PIERINI, Maurizio (CERN)

Presenter: Dr PIERINI, Maurizio (CERN)

Session Classification: Precision physics II

Contribution ID: **30**

Type: **not specified**

WS summary & further discussions

Friday 5 September 2008 17:50 (10 minutes)

Author: Dr UNEL, Gokhan (U.C. Irvine)

Presenter: Dr UNEL, Gokhan (U.C. Irvine)

Session Classification: Closing Remarks

Contribution ID: 31

Type: **not specified**

Production of Single Heavy Charged Leptons at a Linear Collider

Thursday 4 September 2008 17:40 (15 minutes)

A sequential fourth generation of quarks and leptons is allowed by precision electroweak constraints if the mass splitting between the heavy quarks is between 50 and 80 GeV. Although heavy quarks can be easily detected at the LHC, it is very difficult to detect a sequential heavy charged lepton, L , due to large backgrounds. Should the L mass be above 250 GeV, it can not be pair-produced at a 500 GeV ILC. We calculate the cross section for the one-loop process $e^+e^- \rightarrow L\tau$. Although the cross section is small, it may be detectable. We also consider contributions from the two Higgs doublet model and the Randall-Sundrum model, in which case the cross section can be substantially higher.

Author: Prof. SHER, Marc (WMU)

Presenter: Prof. SHER, Marc (WMU)

Session Classification: Prospects for future colliders

Contribution ID: 32

Type: **not specified**

Aspects of the search for stable new generation particles in LHC

Thursday 4 September 2008 15:20 (10 minutes)

Author: Dr BELOTSKY, Konstantin (MEPhI)

Presenter: Dr BELOTSKY, Konstantin (MEPhI)

Session Classification: Impact on Higgs Searches