Elevator Poster Presentations

ICHAPS 2016 CHICAGO
Babar Ali
Institute of Experimental And Applied Physics
Czech Technical University
Search for $t\bar{t}H$ production in $2l + 1\tau_{had}$ channel at $\sqrt{13}$ TeV with the ATLAS experiment

Babar Ali on behalf of the ATLAS collaboration

Fake background estimation (ABCD) Method

- 2 Tight Leptons
- 1 Tight Lepton
- 1 Loose Lepton

Njet $\geq 4$ - A
Njet {2, 3} - B

Best Fit $\mu = \frac{\sigma_{t\bar{t}H}}{\sigma_{t\bar{t}H}^{SM}} = 2.5^{+1.3}_{-1.1}$

ATLAS-CONF-2016-58

https://indico.cern.ch/event/432527/contributions/1072245/
Brenda Fabela
Universidad Autónoma de Zacatecas
The REDTOP experiment

Brenda Fabela – Universidad Autónoma de Zacatecas

The physics

- $\eta/\eta'$ factory, $K$ and $\mu$ beams
- Decay products not expected or suppressed at the $10^{-11}$ level
- $\sim 10^{12} \eta / 10^{10} \eta'$ per year

Symmetry violations
- CP Violation
- CP and C Violation (Dalitz plot)
- T Violation
- CPT Violation
- Single and double lepton flavor violation

Searches for new particles and forces
- True muonium
- Dark photons
- Leptoquarks
- New scalar particles
- New baryonic forces

Further studies
- Proton radius anomaly
- High precision studies on physics BSM
- Nuclear and intermediate energy physics

The experiment

- New experiment proposed at Fermilab
- High intensity class – preparing for PIP-II
- Fixed target
- Novel detector technologies mostly based on Cherenkov light
- The accelerator
- The detector

Further details @ redtop.fnal.gov or visit our poster!
Christine McLean
University of California, Davis
CMS Collaboration
Search for High-Mass $t\bar{t}$ Resonances at CMS

Christine McLean, UC Davis; on behalf of the CMS Collaboration

- New physics search: $Z' \rightarrow t\bar{t}$
- Limits set with $M_{t\bar{t}}$ spectrum
  - No excess observed!
  - Already improving upon 8 TeV results!

See poster for more decay channels!
Federica Bradascio
University of Pisa
Mu2e Collaboration
Studies of the impact of magnetic field uncertainties on the physics parameters of the Mu2e experiment

Federica Bradascio, University of Pisa, on behalf of the Mu2e Collaboration

- Mu2e will search for muons changing into electrons with no neutrinos involved, with a sensitivity $10^4$ better than the current World’s best limit
- Mu2e solenoid system is designed to provide the most intense muon beam in the World
- My work was to study how tiny misalignments in a 13 m long superconducting solenoid can be found and how they can affect the field, thus the signal and backgrounds of the experiment
Katarzyna Frankiewicz
National Centre for Nuclear Research, Poland
Dark Matter searches with the Super-Kamiokande detector

Katarzyna Frankiewicz
National Centre for Nuclear Research

Looking for excess of DM induced \(\nu\)'s from the Milky Way, Sun or Earth core

No excess has been observed as compared to atmospheric \(\nu\) bkg

20 years of data taking!!!

1996-2016

90% CL limits on DM self-annihilation x-section

90% CL limits on WIMP-nucleon scattering x-section

- wide range of tested DM masses
- unique sensitivity for low energies
- various DM annihilation channels considered

Contact: katarzyna.frankiewicz@ncbj.gov.pl
Menglei Sun
Carnegie Mellon University
CMS Collaboration
Achieving the optimal performance of the CMS ECAL in Run II
Menglei Sun on behalf of the CMS Collaboration
Carnegie Mellon University

- The CMS electromagnetic calorimeter (ECAL) is made of 75,848 PbWO$_4$ crystals.

Its performance relies on:
- precise calibration
- accurate reconstruction
- good alignment

- The ECAL has achieved excellent performance in Run II:
  energy resolution for unconverted photons is 1.4 ~ 3% in the barrel, and 3~4% in the endcaps.
Sean Dobbs
Northwestern University
The GlueX Experiment at Jefferson Lab
Sean Dobbs (Northwestern U.) for the GlueX Collaboration

GlueX has finished commissioning and is ready to take physics data in Fall 2016!

Initial measurements of $\gamma p \rightarrow \rho^0 p$, $\rho^0 \rightarrow \pi^+ \pi^-$ show large polarization transfer to $\rho$ meson, with $>10^3$ times more data than previous measurements.

See poster this afternoon for more details! Also: http://gluex.org/ and https://www.jlab.org/Hall-D/
Tanaz Angelina Mohayai
Illinois Institute of Technology
MICE Demonstration of Muon Ionization Cooling

Tanaz Angelina Mohayai

- **Muon Collider & Neutrino Factory.**
- **Why Muon Collider?**
  - e+e- machines radiatively limited as new-physics mass scale ↑. Muon Colliders more compact for a multi-TeV machine.

- **Why Neutrino Factory?**
  - **Intense flux** of muon-decay $\bar{\nu}_e$ and $\nu_\mu$ in equal numbers.

**Challenge:**
- Pion-decay muon beam is diffuse.

**Solution:**
- **Muon Ionization Cooling Experiment** → **rapid beam cooling** – phase-space volume reduction – through ionization energy loss of muons in material.

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References


Karl Warburton
University of Sheffield
Dune Collaboration
The design goals of the DUNE 35-ton Liquid Argon prototype and the first results from operation
Thomas Karl Warburton, University of Sheffield, for the DUNE collaboration
Poster 413 – shown on Saturday 6th August

- The 35 ton is the first DUNE single phase LArTPC prototype and has many features of a full 10 kton module.
- Run 1 showed membrane cryostat can hold high purity Lar
- Run 2 showed purity is not limited by detector components and that reconstruction is possible across multiple drift volumes.
- Many analyses underway including measuring the effect of electron diffusion in liquid argon which is the subject of my poster.
  - The Gaussian width of hits is observed to increase with drift distance and track angle, shown in the plots above.
Youngju Ko
Chung-Ang University
NEOS-Neutrino Experiment for Oscillation at very Short baseline - is an experiment searching for sterile neutrino.

1. NEOS Detector

2. Energy resolution

σ/E ~ 4.9% at 1MeV

3. Pulse Shape Discrimination

More than 70% of background reduced via PSD

4. MC Tuning
Thank you to our speakers!

• Babar Ali
• Brenda Fabela
• Christine McLean
• Federica Bradascio
• Katarzyna Frankiewicz
• Menglei Sun
• Sean Dobbs
• Tanaz Angelina Mohayai
• Karl Warburton
• Youngju Ko