Particle Physics Day 2019

Report of Contributions

https://indico.global/e/9849

Contribution ID: **19** Type: **not specified**

Left-right symmetric extensions of the standard model (invited)

Thursday 7 November 2019 13:30 (25 minutes)

Presenter: HUITU, Katri (Helsinki University)

Session Classification: First afternoon session

Contribution ID: **20** Type: **not specified**

CMS+TOTEM experimental overview (invited)

Thursday 7 November 2019 14:00 (25 minutes)

Presenter: LEHTI, Sami (Helsinki Institute of Physics (FI))

Session Classification: First afternoon session

Contribution ID: **21** Type: **not specified**

Higgs inflation: connecting the electroweak scale to inflation (invited)

Thursday 7 November 2019 15:30 (25 minutes)

The only scalar field in the Standard Model -the Higgs- can drive cosmological inflation. Despite being its simple and conservative construction, Higgs inflation opens up involved questions about loop corrections and renormalisation. It also offers the possibility to distinguish between different gravitational degrees of freedom using measurements of the CMB.

Presenter: RÄSÄNEN, Syksy (University of Helsinki)

Session Classification: Second afternoon session

Contribution ID: **22** Type: **not specified**

Dark matter searches outside the LHC, overview (invited)

Thursday 7 November 2019 16:00 (25 minutes)

Presenter: HEIKINHEIMO, Matti (Helsinki Institute of Physics)

Session Classification: Second afternoon session

Contribution ID: **23** Type: **not specified**

D mesons & Dijets (invited)

Thursday 7 November 2019 11:00 (25 minutes)

I will showcase our recent works on heavy-flavour and dijet production at the LHC.

Presenter: PAUKKUNEN, Hannu (University of Jyväskylä)

Session Classification: Morning session

Contribution ID: **24** Type: **not specified**

ALICE experiment overview (invited)

Thursday 7 November 2019 11:30 (25 minutes)

Presenters: RASANEN, Sami Sakari (Helsinki Institute of Physics (FI)); RASANEN, Sami Sakari (Helsinki Institute of Physics (FI))

Session Classification: Morning session

Contribution ID: **25** Type: **not specified**

Gravitational waves from phase transitions in the early universe

Thursday 7 November 2019 16:30 (8 minutes)

Presenter: GOWLING, Chloe (University of Sussex)

Session Classification: Second afternoon session

Contribution ID: **26** Type: **not specified**

Life after LAGUNA –the status of Pyhäsalmi Mine

Thursday 7 November 2019 16:40 (12 minutes)

The decision of the LAGUNA consortium to jump onboard of non-European projects (namely DUNE and JUNO) could have been the final blow to the underground physics, and the whole re-use of the Pyhäsalmi mine. However, instead, it was the beginning of something new.

Before the activities in Pyhäsalmi Mine had concentrated in underground physics, but now as the main aim fade away, it gave room for new ideas: a multidisciplinary underground R&I centre Callio Lab was born. Different universities and research institutions have already joined the Callio Lab community. Callio Lab is governed by the Kerttu Saalasti Institute of the University of Oulu. Commercial and industrial projects at the Pyhäsalmi Mine are governed by the town of Pyhäjärvi through Pyhäjärven Callio.

In my talk, I will present the current status of Callio Lab, introduce relevant projects and the Callio Lab Visio for 2025 as a national, international underground research infrastructure.

www.calliolab.com
www.callio.info

Presenter: JOUTSENVAARA, jari (University of Oulu)

Session Classification: Second afternoon session

Contribution ID: **27** Type: **not specified**

Detecting muons with SC16 detectors

Thursday 7 November 2019 12:10 (8 minutes)

Very large muon multiplicities were observed in DELPHI, L3+C, and ALEPH at LEP and also in ALICE at LHC. Their effective measurement times were very short. Cosmic-ray experiment EMMA in the Pyhäsalmi mine operates at about the same depth and high-multiplicity muon data has been collected for over a year using multipixel SC16 plastic scintillation detectors.

The SC16 detectors were also used in a measurement campaign that was performed at the Canfranc Underground Laboratory (LSC), Spain, to determine the directional muon flux in the laboratory.

Several high-multiplicity events have been observed in EMMA and a clear mountain profile was measured at Canfranc. Currently the EMMA-data is being interpreted in terms of CORSIKA simulations for air-shower physics and Geant4 simulations for rock penetration of muons and detector performance.

Presenter: ENQVIST, Timo

Session Classification: Morning session

Contribution ID: **28** Type: **not specified**

Results and prospects with the CMS-TOTEM Precision Proton Spectrometer

Thursday 7 November 2019 14:40 (8 minutes)

With more than 100 fb-1 collected along LHC run 2, the CMS-TOTEM Precision Proton Spectrometer allows to probe the fundamental structure of the Standard model in various ways through the detection of forward scattered protons in combination with the central system. In this talk, the spectrometer and its detection principles will be presented, along with the first result obtained so far. In addition, prospects for future studies are introduced.

Presenter: FORTHOMME, Laurent (Helsinki Institute of Physics (FI))

Session Classification: First afternoon session

Contribution ID: **29** Type: **not specified**

Recent physics results from TOTEM

Thursday 7 November 2019 14:30 (8 minutes)

The talk will contain a brief description of the most recent physics results from the TOTEM experiment at the LHC, especially the ones concerning the evidence of the t-channel exchange of a colourless C-odd three-gluon compound state, the so-called Odderon, in elastic scattering. Also a short description of the future plans of the experiment will be included.

Presenter: OSTERBERG, Kenneth (Helsinki Institute of Physics (FI))

Session Classification: First afternoon session

Contribution ID: **30** Type: **not specified**

Holographic Complex CFTs

Thursday 7 November 2019 14:50 (8 minutes)

The loss of criticality in the form of weak first-order transitions or the end of the conformal window in gauge theories can be described as the merging of two fixed points that move to complex values of the couplings. When the complex fixed points are close to the real axis, the system typically exhibits walking behavior with Miransky (or BKT) scaling. I will present a realization of these phenomena at strong coupling by means of the gauge/gravity duality, and give evidence for the conjectured existence of complex conformal field theories at the fixed points.

Presenter: SUBILS, Javier

Session Classification: First afternoon session

Contribution ID: **31** Type: **not specified**

Probing Physics Beyond the Standard Model in Finland?

Thursday 7 November 2019 12:20 (8 minutes)

There is a broad consensus that we are at the threshold of a major breakthrough referred to as physics Beyond the Standard Model (BSM). If one agrees with the inadequacy of the Standard Model (SM) to explain the growing list of new, puzzling phenomena, it becomes obvious that the first key steps towards the solution are bound to come from experiments. It is also expected that neutrinos –the only known particles that disobey the predictions of the SM –are the most likely messengers of BSM. And indeed, there is an impressive global effort towards the design, construction and operation of giant neutrino experiments like DUNE, JUNO, HyperK, IceCube or KM3NeT. The relevant questions to the Finnish community are: to what extend should we be part of that research and, more specifically, what could be done in Finland. In my presentation I'll outline three realistic options for a low-cost entry into that challenging field.

Presenter: TRZASKA, Wladyslaw Henryk (University of Jyvaskyla (FI))

Session Classification: Morning session

Contribution ID: **32** Type: **not specified**

Relativistic magneto-hydrodynamics in heavy-ion collisions

Thursday 7 November 2019 12:00 (8 minutes)

Presenter: Dr INGHIRAMI, Gabriele (University of Jyväskylä)

Session Classification: Morning session