

From Higgs to Dark Matter, Geilo 2012, Dr Holms Hotel



Report of Contributions

Contribution ID: 87

Type: **talk**

If the neutralino is not dark matter, can it be heavier than the chargino?

Tuesday, 18 December 2012 18:45 (25 minutes)

If R-parity is violated, we no longer expect the neutralino to be dark matter. Then one might ask, is it possible for the chargino to be lighter than the neutralino in such scenarios?

That would indeed lead to spectacular signals at the LHC, like chargino decays to three charged leptons. This possibility was studied using bayesian scanning in the form of SuperBAYES.

Using Non-universal Higgs masses as well as gaugino mass parameters, in order to allow maximum freedom in the neutralino sector, the conclusion is that the chargino-neutralino mass difference is unlikely to go much below 130 MeV.

However, with the most important competing decay channel for the chargino being to neutralino and pion, this is small enough to allow R-parity violating chargino decays at the LHC.

Primary author: BOMARK, Nils-Erik (University of Bergen)

Presenter: BOMARK, Nils-Erik (University of Bergen)

Session Classification: Dark Matter and SUSY, models

Track Classification: Preliminary version of material to be approved

Contribution ID: **88**

Type: **talk**

Constraining mSUGRA with Dark Matter searches and the LHC

Tuesday, 18 December 2012 15:00 (20 minutes)

The LHC is steadily setting new limits on the supersymmetric, and particularly the mSUGRA parameter space. This talk will concern the intersection of astrophysical searches for dark matter and LHC searches, and the prospect of an ATLAS analysis of a plane of the parameter space.

Primary author: MORA, Knut Dundas (University of Bergen (NO))

Presenter: MORA, Knut Dundas (University of Bergen (NO))

Session Classification: Dark Matter and Supersymmetry, LHC

Track Classification: Preliminary version of material to be approved

Contribution ID: 89

Type: **talk**

Search for SUSY in tau final states at ATLAS

Tuesday, 18 December 2012 15:25 (20 minutes)

Supersymmetry (SUSY) is a theoretically attractive model of particle physics which solves many of the theoretical problems of the Standard Model. An important one of these, dark matter, is solved in SUSY by the production of new stable, weakly interacting particles. With the unprecedented energy and luminosity of the Large Hadron Collider (LHC) large regions of the SUSY parameter space may be investigated and new heavy and rare particles can be searched for. A search for Supersymmetry with tau leptons in the final state, using data collected in 2011 at the ATLAS detector at the LHC will be presented. A combined search including final states with missing energy, jets, light leptons and at least one tau (one tau, two tau, tau+e and tau+mu) has been carried out. The results are used to set limits on the visible cross section of new physics processes and producing exclusion limits on a specific SUSY model (GMSB).

Primary author: Mr DALE, Ørjan (University of Bergen)

Presenter: Mr DALE, Ørjan (University of Bergen)

Session Classification: Dark Matter and Supersymmetry, LHC

Track Classification: Preliminary version of material to be approved

Contribution ID: 90

Type: talk

Indirect detection of DM with gamma-ray experiments

Monday, 17 December 2012 10:30 (40 minutes)

Dark Matter in form of Weakly Interacting Massive Particles can annihilate and produce high energy ($E > 100 \text{ MeV}$) gamma rays. Not deflected by magnetic field, they can be used to probe for the existence of DM in different location, e.g. at the Galactic centre or in dwarf spheroidal galaxies. Pair conversion space-based telescopes like Fermi-LAT, and an array of imaging atmospheric Cherenkov telescopes such as H.E.S.S. or the future CTA, have reached the sensitivity to study models with relic density thermally allowed. In this talk I will describe the functioning principles of these experiments and present some of the latest results.

Primary author: Dr FARNIER, Christian (Oskar Klein Centre, Stockholm University)

Presenter: Dr FARNIER, Christian (Oskar Klein Centre, Stockholm University)

Session Classification: Indirect searches of DM in gamma gamma detection

Track Classification: Preliminary version of material to be approved

Contribution ID: 91

Type: **talk**

Hunting for the Z and Higgs boson - an IPPOG ATLAS Masterclass

The International Particle Physics Outreach Group arrange Masterclasses for teachers and high school students across the world. \ An IPPOG Masterclass is an educational resource which utilizes real data from LHC to give insight in particle physics, and hands-on experience with data analysis. \ In 2011, the IPPOG Masterclasses underwent a substantial upgrade, and new of next year, is a Higgs search introduced as follow-up of the recent discovery by ATLAS and CMS.\ This presentation will give an overview of the ATLAS Masterclasses, and describe the latest developments including the Higgs search.

Primary author: Ms PEDERSEN, Maiken (University of Oslo)

Presenter: Ms PEDERSEN, Maiken (University of Oslo)

Track Classification: Preliminary version of material to be approved

Contribution ID: 92

Type: **talk**

SUSY and Dark Matter with tau leptons at the LHC

Monday, 17 December 2012 17:30 (20 minutes)

Search for Supersymmetry in p-p collision events with large missing transverse momentum, jets, and tau leptons with the ATLAS detector

Primary author: Dr LIEBIG, Wolfgang (University of Bergen)

Presenter: Dr LIEBIG, Wolfgang (University of Bergen)

Session Classification: Dark Matter and Supersymmetry, LHC

Track Classification: Preliminary version of material to be approved

Contribution ID: 94

Type: **talk**

Statistical methods in Higgs to gamma gamma signal extraction and mass measurement

Tuesday, 18 December 2012 17:30 (20 minutes)

Statistical methods in Higgs to gamma gamma signal extraction and mass measurement

Primary author: Prof. READ, Alex (University of Oslo)

Presenter: Prof. READ, Alex (University of Oslo)

Session Classification: Getting most out of the Higgs measurements

Track Classification: Preliminary version of material to be approved

Contribution ID: 95

Type: **talk**

SUSY and DM with ATLAS

Monday, 17 December 2012 16:00 (50 minutes)

An overview of the current ATLAS SUSY search strategy and results is given. This includes published analyses using up to $\sim 13 \text{ fb}^{-1}$ from the 8 TeV data set ("HCP status"). In the interpretation some emphasis is set on models providing dark matter candidates ($\sim 40+10 \text{ min}$).

Primary author: Dr HAUG, Sigve (AEC University of Bern)

Presenter: Dr HAUG, Sigve (AEC University of Bern)

Session Classification: Dark Matter and Supersymmetry, LHC

Track Classification: Preliminary version of material to be approved

Contribution ID: 96

Type: **talk**

Higgs, second scalar and an axion in the Conformal Standard Model

Tuesday, 18 December 2012 16:10 (45 minutes)

Higgs, second scalar and an axion in the Conformal Standard Model

Primary author: Prof. MEISSNER, Krzysztof (University of Warsaw)

Presenter: Prof. MEISSNER, Krzysztof (University of Warsaw)

Session Classification: Conformal Standard Model, Higgs and Dark Matter

Track Classification: Preliminary version of material to be approved

Contribution ID: 99

Type: **not specified**

Dark Matter: present and future of direct and indirect searches

Monday, 17 December 2012 09:10 (50 minutes)

Different techniques are being used to characterize the nature of Dark Matter, and to test whether its properties can explain the astronomers' puzzling observations: from underground detector to telescopes and satellites observing debris produced by Dark Matter annihilation in the Universe. I will give a review of direct and indirect searches, focusing on some of the latest results and future projects.

Primary author: Dr VALLECORSIA, Sofia (Israel Institute of Technology (IL))

Presenter: Dr VALLECORSIA, Sofia (Israel Institute of Technology (IL))

Session Classification: Non accelerator searches for DM

Track Classification: Preliminary version of material to be approved

Contribution ID: **100**

Type: **talk**

Comparison of neutralino and sneutrino dark matter in a model with spontaneous CP violation

Tuesday, 18 December 2012 18:20 (25 minutes)

Comparison of neutralino and sneutrino dark matter in a model with spontaneous CP violation

Primary author: Mr RUPPELL, Timo

Presenter: Mr RUPPELL, Timo

Session Classification: Dark Matter and SUSY, models

Track Classification: Preliminary version of material to be approved

Contribution ID: **101**

Type: **talk**

Outreach in particle and astroparticle physics in Portugal

Monday, 17 December 2012 19:30 (20 minutes)

An overview of recent activities in particle and astroparticle physics is given. Seminars, master-classes and projects to be carried out by students both in research labs and in the schools are presented. Special emphasis is given to activities related to the LIP participation in the LHC experiments and in the Pierre Auger Observatory.

Primary author: ESPIRITO SANTO, Catarina (LIP)

Presenter: ESPIRITO SANTO, Catarina (LIP)

Session Classification: Outreach in particle and astroparticle physics

Contribution ID: **102**Type: **talk**

Search for viable SUSY Models Discoverable at LHC

Tuesday, 18 December 2012 15:45 (25 minutes)

We present a framework for finding interesting regions of Supersymmetric parameter space, in light of experimental constraints and the possibility of detection at LHC using specific experimental signatures. The framework has been applied to find viable CMSSM models with τ -lepton signatures observable with the 2012 LHC data.

Primary authors: LIPNIACKA, Anna (University of Bergen (NO)); SANDAKER, Heidi (University of Bergen (NO)); LINDROOS, Jan Oye (University of Bergen (NO)); Dr BURGESS, Thomas (University of Bergen (NO))

Presenter: LINDROOS, Jan Oye (University of Bergen (NO))

Session Classification: Dark Matter and Supersymmetry, LHC

Contribution ID: **103**Type: **talk**

Making the most of Higgs to tautau

Tuesday, 18 December 2012 17:50 (30 minutes)

With a mass around 125 GeV, a handful of events are already expected to be present in the current ATLAS analysis searching for the SM higgs in the tau+tau-. Unfortunately, this channel has low mass resolution and high backgrounds, notably from Z decays, so it is difficult to establish a significant signal. In addition to reviewing the latest ATLAS results, this talk also presents some ideas that could be helpful in optimising the sensitivity to a signal, and eventually contribute to establishing the spin of a higgs candidate.

Primary author: Prof. STUGU, Bjarne (Bergen)

Co-author: Mr ROSENDAHL, Peter (Bergen)

Presenter: Prof. STUGU, Bjarne (Bergen)

Session Classification: Getting most out of the Higgs measurements

Track Classification: Preliminary version of material to be approved

Contribution ID: **107**

Type: **talk**

Higgs measurements and perspectives

Monday, 17 December 2012 15:00 (50 minutes)

The most relevant results by the ATLAS collaboration will be summarised, focusing on the perspectives of measurements and analyses that can be performed shortly after the shutdown.

Primary author: FERRARI, Pamela (NIKHEF (NL))

Presenter: FERRARI, Pamela (NIKHEF (NL))

Session Classification: Higgs searches, review

Track Classification: Preliminary version of material to be approved

Contribution ID: **108**Type: **talk**

Monojets and Monophotons at ATLAS

Tuesday, 18 December 2012 10:30 (45 minutes)

Studies of events with single high energy jet or photon and large missing transverse momentum at the Large Hadron Collider is

one of the most direct way to search for physics beyond the Standard Model.

The backgrounds from Standard Model processes are dominated by jets/photons production associated with Z or W

bosons that undergo leptonic decays to neutrinos and/or unidentified electrons or muons.

The sensitivity to new physics signals relies on the good understanding and the accurate estimation of these backgrounds, and therefore the use of data-driven techniques is often required.

In this talk I will present a compilation of the latest results from the monojets and monophotons searches

based on the analysis of the 2011 and 2012 pp collision data

collected with the ATLAS detector at a center-of-mass energy of 7 TeV and 8 TeV respectively.

The results are interpreted in the context of various models Beyond the Standard Model but a particular attention is put on the standard “WIMP miracle” dark matter scenario, and the comparisons with

the Direct and Indirect Detection experiments.

Primary author: ABDALLAH, Jalal (Universitat Autònoma de Barcelona (ES))

Presenter: ABDALLAH, Jalal (Universitat Autònoma de Barcelona (ES))

Session Classification: monojets and monophotons review

Contribution ID: **109**

Type: **not specified**

IPPOG Masterclasses 2013

Monday, 17 December 2012 19:10 (20 minutes)

The International Particle Physics Outreach Group arrange Masterclasses for teachers and high school students across the world. \

An IPPOG Masterclass is an educational resource which utilizes real data from LHC to give insight in particle physics, and hands-on experience with data analysis. \

In 2011, the IPPOG Masterclasses underwent a substantial upgrade, and new of next year, is a Higgs search introduced as follow-up of the recent discovery by ATLAS and CMS.\

This presentation will give an overview of the ATLAS Masterclasses, and describe the latest developments including the Higgs search.

Primary author: Ms PEDERSEN, Maiken (University of Oslo)

Co-author: Prof. OULD-SAADA, Farid (University of Oslo)

Presenter: Ms PEDERSEN, Maiken (University of Oslo)

Session Classification: Outreach in particle and astroparticle physics

Contribution ID: **110**

Type: **not specified**

Linking accelerator and non accelerator searches for DM

Tuesday, 18 December 2012 09:00 (45 minutes)

Presenter: SANDAKER, Heidi (University of Bergen (NO))

Session Classification: Linking accelerator and non-accelerator searches for DM

Contribution ID: **111**

Type: **not specified**

From Higgs to Dark Matter

Monday, 17 December 2012 18:10 (50 minutes)

Presenters: MAHMOUDI, Nazila (Universite Blaise Pascal (FR)); Dr MAHMOUDI, Nazila (LPC Clermont & CERN)

Session Classification: From Higgs to DM, models

Contribution ID: 112

Type: **not specified**

Axions, experiment and theory

Wednesday, 19 December 2012 09:00 (35 minutes)

Presenter: Prof. MEISSNER, Krzysztof (Institute of Theoretical Physics, University of Warsaw)

Session Classification: Axions and Dark Matter, experiments, theory