Curriculum vitæ

Ruggero Turra

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August 10, 2012

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Education

Master's degree "Laurea Specialistica" (2009)

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20126 Milano

Thesis (2009): Study of the decay $B_s^0 \to D_s^+ D_s^-$
Supervisor: Marta Calvi
110/110 cum laude

Bachelor's Degree "Laurea Triennale" (2006)

Università degli Studi di Milano-Bicocca
Piazza dell'Ateneo Nuovo, 1
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Thesis (2006): Simulazioni Monte Carlo per l'esperimento CUORE
Supervisor: Chiara Brofferio
Assistant supervisor: Maura Pavan
110/110 cum laude

Diploma (2003)

Liceo Scientifico Tecnologico
Via Matilde di Canossa 21
26013 Crema (CR)

Maturita scientifica: 100/100

Present position

Università degli Studi di Milano
Dipartimento di Fisica
Via Celoria, 16
20133 Milano

2010 – today: PhD student XXV ciclo

Past research activities

Simulazioni Monte Carlo per l'esperimento CUORE (Bachelor's Degree Thesis 2006)

CUORE (Cryogenic Underground Observatory for Rare Events) is an array made with TeO_2 bolometers designed for the search of neutrinoless double beta decay (DBD0ν) of ^{130}Te. The observation of this decay would confirm that neutrino is a massive particle and would prove that it's of Majorana type.

The experiment operation requires a periodic energy calibration of the detectors with a radioactive source. This is obtained by inserting some Th wires, in between the TeO_2 crystals of the array. The technical difficulty is due to the fact that the array is housed – in high vacuum – inside a cryostat, at 10 mK. The optimal calibration system has to be fast, not to waste time during the real measure, to use the minimum number of Th wires to be inserted into the cryostat and to avoid pile-up problems. The purpose of my thesis had been the study of the best calibration configuration by the use of Monte Carlo simulations. We have analyzed how the calibration time changes when modifying the disposition and the number of calibration wires. Moreover we have estimated how the pile-up affects the detector performances and how much the calibration function is accurate varying the considered number of gamma lines.

Study of the decay $B_s^0 \to D_s^+ D_s^-$ (Master degree Thesis 2009)

The Large Hadron Collider beauty experiment (LHCb) which is installed at LHC at CERN, is devoted to B physics. Its main goal is the study of CP asymmetry and rare decay channel of b hadron.

The goal of this thesis was the study of the $B_s^0 \to D_s^+ D_s^-$ in which the $D_s^\pm$ mesons are detected by their $KK\pi$ decay [158]. It is a totally hadronic decay with high multiplicity.

The products of the B_s^0 decays of this channel build up an even CP eigenstate, so it will be possible to study the proper time of this component.

Since at that time LHC was not running yet, this study was entirely based on Monte Carlo data. I have optimized a selection to separate the events dealing with the studied channel from the background events, consisting of $b\bar{b}$ inclusive background. I had studied two selections, of which one is a generic selection, while the other one is based on the selection of the decays where both the $D_s^\pm$ decay through a ϕ or K^{0*} resonance. Using these selections I extracted the decay proper time, and made an estimation of the statistical error on the data taken in a year at LHCb, using the technique of Toy Monte Carlo. From this information I extracted the parameter $\Delta\Gamma_s/\Gamma_s$ by comparing the proper time of the studied decay and the proper time of the semileptonic decay.

LHCb Cherenkov detectors (2009)

The LHCb detector has two RICH subdetectors to identify particles, in particular to distinguish between hadrons $\pi/K/p$ in the momentum interval $1 - 150\,\mathrm{GeV}$. RICH detectors use the Cherenkov effect, and detect Cherenkov photons using Hybrid Photon Detectors.

My work is related to the reconstruction of the Cherenkov rings, from these using the momentum information it is possible to measure the mass of the particles and then to identify them. The main algorithm uses information from the tracks, but sometimes this information is missing. I studied trackless pattern recognition algorithm, for example Hough transform, deformable templates, robust fitting, Metropolis-Hastings Markov chains.

An other work was the online measurement of the refraction index of the areogel (one of the RICH1 radiator) using high momentum particles.

Present research activities

I currently work in the ATLAS Collaboration since January 1st, 2010, and I am an ATLAS qualified author since February 1st, 2011. My activity is focused on the performance of the electromagnetic calorimeter and on the photon physics, both within the Standard Model analyses and the search for the Higgs Boson.

Study of the shower shape variables with early data (2010)

The ATLAS detector is provided with an electromagnetic calorimeter to measure the energy of electrons and photons. The calorimeter uses absorbers made of lead and liquid argon as detection medium and it is divided in three longitudinal layers.

Thanks to to the segmentation and the granularity of the calorimeter it is possible to define a set of shower shape variables that can be used to define several selection cuts to reject the background, in particular from QCD and from photons from the decay of neutral pions. My first work in ATLAS was the study of these shower shape variables comparing data with $\sqrt{s} = 900\,\text{GeV}$ and Monte Carlo simulations [170].

Electromagnetic calibration using Calibration Hits method (2010 – today)

A proper calibration of the energy measured by the electromagnetic calorimeter is essential for physics studies.

The Calibration Hits method [171] is based on Monte Carlo simulations that describe the energy deposition in the active but also in the passive parts of the detector. Using these simulations it is possible to parametrize the non-reconstructed energy versus measurable quantities as the energy deposited in the three layers of the calorimeter and in the presampler, and the longitudinal barycenter of the electromagnetic shower.

For the 2011 data taking I've optimized and tested such a calibration, which is now used in the ATLAS event reconstruction.

Study of dead material effect on the ATLAS electromagnetic calorimeter (2010)

In the ATLAS event simulation, the knowledge of the detector geometry is a fundamental ingredient for an accurate modelling of the particles' interaction with the material. This description is not perfect and this may lead to discrepancies between simulated and measured quantities.

Using Monte Carlo simulations with distorted geometry in various parts of the detector I've studied the effect of additional dead materials on some quantities for electrons and photons: reconstructed energy, cluster-track matching, conversion/bremsstrahlung probability, shower shapes, efficiency of reconstruction and efficiencies of identification.

Study of inclusive prompt photon at the ATLAS detector (2010)

The first physics result on photon published by ATLAS is the measurement of the inclusive isolated prompt photon cross section using $850\,\text{nb}^{-1}$ [172][159] followed by an update with $35\,\text{pb}^{-1}$[1][173][165, 166]. Prompt photons production

provides a colorless probe of the hard scattering process, and it can be used to constrain parton density functions.

One of the main ingredients for the computation of the cross section is the computation of the photon purity [174]. I worked in this topic using the two dimensional sideband data driven method [175].

Study of isolated diphoton at the ATLAS detector (2010 – 2011)

The measurement of the diphoton production cross section [176] is of great interest as a probe to the QCD, especially in some kinematic regions such as small azimuthal separation or balanced back-to-back topology. In addition diphoton events are the irreducible background for the Higgs decay into two photons. Three differential cross-sections are measured as functions of invariant mass, azimuthal separation of the two photons and transverse momentum of the system.

I've followed the full analysis, ended with a publication [2], in particular I focused on the purity, the background decomposition using the 4×4 matrix method, the background removal from electron misidentified as photons and the unfolding of the three spectra.

Study of vertexing for the $H \to \gamma\gamma$ at the ATLAS detector (2011 – today)

The search for the Higgs boson is one of the main goals of the ATLAS experiment. I'm following the analysis of the decay of the Higgs into the di-photon channel[3][177][160][162].

To improve the sensitivity to the Higgs mass peak one has to improve the peak resolution. Two things can improve the resolution of the Higgs invariant mass: the first is a very good electromagnetic energy calibration, the second is a proper measurement of the direction of the two photons.

To improve the latter, one can constrain the direction of the photons to pass through the primary vertex. Depending on the condition of the luminosity ATLAS reconstructs 5-6 primary vertexes for every collision. The goal of this work is to select the most probable vertex from which the photon pair originates.

Background estimation for the $H \to \gamma\gamma$ at the ATLAS detector (2011 – today)

As in the di-photon study I've implemented the 4×4 matrix to decompose the background [178]. Thanks to the new statistics it is possible to take into account additional information, for example the dependency of the isolation on the number of primary vertexes. This method agrees with the other methods already used.

Study for improvement of the converted photon energy resolution (2011)

One of the most important requirement for resonance searches with photons (e.g. $H \to \gamma\gamma$) is a good energy resolution. Being already involved in the photon and electron calibration since 2010, I'm trying to improve the energy resolution for converted photons using as additional information the reconstructed radius of conversion. In fact the energy for photon with early conversion needs to be more corrected than photon with late conversion because of two reasons: the energy lost before the calorimeter is greater because the two electrons have more material to pass through and because the energy outside the sliding window is greater.

Using this information it is possible to improve the resolution, in particular from study on Monte-Carlo simulation it is possible to reduce the RMS of the $H \to \gamma\gamma$ mass by a factor or 7% considering only pair of converted photons. From this study I've produced a tool to be apply on data to correct the calibrated energy.

Today this correction is approved by the e/gamma group and used by the $H \to \gamma\gamma$ analysis.

MVA energy calibration (2012 – today)

Looking carefully to the energy calibration for electromagnetic particles it is clear that there are some dependencies that are not taken into account. To take into account a lot of variables at the same time MVA optimizations are needed. For this study I've create a small group of people working together including a summer student. Some new variables have been created, the most powerful one is the measurement of the amount of material traversed by each track.

The work is in a good shape and for example there are improvement on the $H \to \gamma\gamma$ invariant mass of the order of $5 - 10\%$.

$H \to \gamma\gamma$ + MET (2012 – today)

Presently I'm involved into some cross checks about the missing transverse energy for the $H \to \gamma\gamma$ analysis. In particular we're checking the object definition entering in the MET computation to be consistent with the $H \to \gamma\gamma$ analysis.

Operational activities

From October 2011 I'm a hardware on-call expert for the liquid argon subsystem of the ATLAS detector (electromagnetic calorimeter in the barrel and in the endcaps and hadronic calorimeter in the endcaps). In particular the activity is focused on the operation of the high voltage modules.

Teaching activities

In the academic year 2010/11 I was assistant of prof. Fernando Palombo during the course "Laboratorio di Trattamento Numerico dei Dati Sperimentali".

In the academic year 2011/12 I am assistant of dott. Leonardo Carminati during the course "Laboratorio di Trattamento Numerico dei Dati Sperimentali".

During the 2012 summer I've been the supervisor of a summer student at CERN.

Schools

During September 2011 I participated to the 19th European Schools of High-Energy Physics (ESHEP). The main topics have been: Standard Model, beyond the Standard Model, cosmology, QCD, flavour physics, heavy-ion physics, neutrino physics and statistical tools.

During the school I've shown the poster [163] presented at the PLHC conference. The proceedings [164] of the poster are going to be published.

Publications and notes

157 publications as ATLAS author

Publications

[1] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the inclusive isolated prompt photon cross-section in pp collisions at sqrt(s)= 7 TeV using 35 pb-1 of ATLAS data*, Phys.Lett. **B706** (2011) 150–167, arXiv:1108.0253 [hep-ex].

[2] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the isolated di-photon cross-section in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector*, Phys.Rev. **D85** (2012) 012003, arXiv:1107.0581 [hep-ex].

[3] ATLAS Collaboration Collaboration, G. Aad et al., *Search for the Standard Model Higgs boson in the diphoton decay channel with 4.9 fb-1 of pp collisions at sqrt(s)=7 TeV with ATLAS*, Phys.Rev.Lett. **108** (2012) 111803, arXiv:1202.1414 [hep-ex].

[4] ATLAS Collaboration Collaboration, G. Aad et al., *Search for a supersymmetric partner to the top quark in final states with jets and missing transverse momentum at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1208.1447 [hep-ex].

[5] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of WZ production in proton-proton collisions at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1208.1390 [hep-ex].

[6] ATLAS Collaboration Collaboration, G. Aad et al., *Search for squarks and gluinos with the ATLAS detector in final states with jets and missing transverse momentum using 4.7 fb^{-1} of sqrt(s) = 7 TeV proton-proton collision data*, arXiv:1208.0949 [hep-ex].

[7] ATLAS Collaboration Collaboration, G. Aad et al., *Time-dependent angular analysis of the decay $B_s \to J/\psi\phi$ and extraction of $\Delta\Gamma_s$ and the CP-violating weak phase ϕ_s by ATLAS*, arXiv:1208.0572 [hep-ex].

[8] ATLAS Collaboration Collaboration, G. Aad et al., *Underlying event characteristics and their dependence on jet size of charged-particle jet events in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1208.0563 [hep-ex].

[9] ATLAS Collaboration Collaboration, G. Aad et al., *Observation of a new particle in the search for the Standard Model Higgs boson with the ATLAS detector at the LHC*, arXiv:1207.7214 [hep-ex].

[10] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of charged-particle event shape variables in sqrt(s) = 7 TeV proton-proton interactions with the ATLAS detector*, arXiv:1207.6915 [hep-ex].

[11] ATLAS Collaboration Collaboration, G. Aad et al., *Search for magnetic monopoles in sqrt(s) = 7 TeV pp collisions with the ATLAS detector*, arXiv:1207.6411 [hep-ex].

[12] ATLAS Collaboration Collaboration, G. Aad et al., *Measurements of top quark pair relative differential cross-sections with ATLAS in pp collisions at sqrt(s) = 7 TeV*, arXiv:1207.5644 [hep-ex].

[13] ATLAS Collaboration Collaboration, G. Aad et al., *Search for top and bottom squarks from gluino pair production in final states with missing transverse energy and at least three b-jets with the ATLAS detector*, arXiv:1207.4686 [hep-ex].

[14] ATLAS Collaboration Collaboration, G. Aad et al., *A search for $t\bar{t}$ resonances in lepton+jets events with highly boosted top quarks collected in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector*, arXiv:1207.2409 [hep-ex].

[15] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the Λ_b lifetime and mass in the ATLAS experiment*, arXiv:1207.2284 [hep-ex].

[16] ATLAS Collaboration Collaboration, G. Aad et al., *Combined search for the Standard Model Higgs boson in pp collisions at $\sqrt{s} = 7$ TeV with the ATLAS detector*, arXiv:1207.0319 [hep-ex].

[17] ATLAS Collaboration Collaboration, G. Aad et al., *Search for the Standard Model Higgs boson produced in association with a vector boson and decaying to a b-quark pair with the ATLAS detector*, arXiv:1207.0210 [hep-ex].

[18] ATLAS Collaboration Collaboration, G. Aad et al., *Search for the Higgs boson in the $H \to WW \to l\nu jj$ decay channel at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1206.6074 [hep-ex].

[19] ATLAS Collaboration Collaboration, G. Aad et al., *Search for the Standard Model Higgs boson in the H to tau+ tau- decay mode in sqrt(s) = 7 TeV pp collisions with ATLAS*, arXiv:1206.5971 [hep-ex].

[20] ATLAS Collaboration Collaboration, G. Aad et al., *ATLAS measurements of the properties of jets for boosted particle searches*, arXiv:1206.5369 [hep-ex].

[21] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the b-hadron production cross section using decays to $D^* \mu^- X$ final states in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1206.3122 [hep-ex].

[22] ATLAS Collaboration Collaboration, G. Aad et al., *Search for a Standard Model Higgs boson in the mass range 200-600 GeV in the $H \to ZZ \to l^+ l^- q\bar{q}$ decay channel*, arXiv:1206.2443 [hep-ex].

[23] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of event shapes at large momentum transfer with the ATLAS detector in pp collisions at sqrt(s) = 7 TeV*, arXiv:1206.2135 [hep-ex].

[24] ATLAS Collaboration Collaboration, G. Aad et al., *Hunt for new phenomena using large jet multiplicities and missing transverse momentum with ATLAS in 4.7 fb^{-1} of sqrt(s) = 7 TeV proton-proton collisions*, arXiv:1206.1760 [hep-ex].

[25] ATLAS Collaboration Collaboration, G. Aad et al., *Search for the Standard Model Higgs boson in the $H \to WW(*) \to l\nu l\nu$ decay mode with 4.7 fb^{-1} of ATLAS data at sqrt(s) = 7 TeV*, arXiv:1206.0756 [hep-ex].

[26] ATLAS Collaboration Collaboration, G. Aad et al., *A search for flavour changing neutral currents in top-quark decays in pp collision data collected with the ATLAS detector at sqrt(s) = 7 TeV*, arXiv:1206.0257 [hep-ex].

[27] ATLAS Collaboration Collaboration, G. Aad et al., *Search for a Standard Model Higgs boson in the $H \to ZZ \to l^+ l^- \nu\bar{\nu}$ decay channel using 4.7 fb^{-1} of sqrt(s) = 7 TeV data with the ATLAS detector*, arXiv:1205.6744 [hep-ex].

[28] ATLAS Collaboration Collaboration, G. Aad et al., *Evidence for the associated production of a W boson and a top quark in ATLAS at sqrt(s) = 7 TeV*, arXiv:1205.5764 [hep-ex].

[29] ATLAS Collaboration Collaboration, G. Aad et al., *A search for ttbar resonances with the ATLAS detector in 2.05 fb^{-1} of proton-proton collisions at sqrt(s) = 7 TeV*, Eur.Phys.J. **C72** (2012) 2083, arXiv:1205.5371 [hep-ex].

[30] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the t-channel single top-quark production cross section in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1205.3130 [hep-ex].

[31] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of W gamma and Z gamma production cross sections in pp collisions at sqrt(s) = 7 TeV and limits on anomalous triple gauge couplings with the ATLAS detector*, arXiv:1205.2531 [hep-ex].

[32] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the W boson polarization in top quark decays with the ATLAS detector*, JHEP **1206** (2012) 088, arXiv:1205.2484 [hep-ex].

[33] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the top quark pair cross section with ATLAS in pp collisions at sqrt(s) = 7 TeV using final states with an electron or a muon and a hadronically decaying τ lepton*, arXiv:1205.2067 [hep-ex].

[34] ATLAS Collaboration Collaboration, G. Aad et al., *Search for tb resonances in proton-proton collisions at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1205.1016 [hep-ex].

[35] ATLAS Collaboration Collaboration, G. Aad et al., *Search for lepton flavour violation in the emu continuum with the ATLAS detector in sqrt(s) = 7 TeV pp collisions at the LHC*, Eur.Phys.J. **C72** (2012) 2040, arXiv:1205.0725 [hep-ex].

[36] ATLAS Collaboration Collaboration, A. Collaboration et al., *Search for a fermiophobic Higgs boson in the diphoton decay channel with the ATLAS detector*, arXiv:1205.0701 [hep-ex].

[37] ATLAS Collaboration Collaboration, G. Aad et al., *Search for scalar top quark pair production in natural gauge mediated supersymmetry models with the ATLAS detector in pp collisions at sqrt(s) = 7 TeV*, arXiv:1204.6736 [hep-ex].

[38] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of τ polarization in $W \to \tau\nu$ decays with the ATLAS detector in pp collisions at sqrt(s) = 7 TeV*, Eur.Phys.J. **C72** (2012) 2062, arXiv:1204.6720 [hep-ex].

[39] ATLAS Collaboration Collaboration, G. Aad et al., *Search for supersymmetry in events with three leptons and missing transverse momentum in sqrt(s) = 7 TeV pp collisions with the ATLAS detector*, Phys.Rev.Lett. **108** (2012) 261804, arXiv:1204.5638 [hep-ex].

[40] ATLAS Collaboration Collaboration, G. Aad et al., *Search for TeV-scale gravity signatures in final states with leptons and jets with the ATLAS detector at sqrt(s) = 7 TeV*, arXiv:1204.4646 [hep-ex].

[41] ATLAS Collaboration Collaboration, G. Aad et al., *Search for supersymmetry with jets, missing transverse momentum and at least one hadronically decaying tau lepton in proton-proton collisions at sqrt(s) = 7 TeV with the ATLAS detector*, Phys. Lett. **B714** (2012) 197–214, arXiv:1204.3852 [hep-ex].

[42] ATLAS Collaboration Collaboration, G. Aad et al., *Search for charged Higgs bosons decaying via $H^+ \to \tau\nu$ in top quark pair events using pp collision data at sqrt(s) = 7 TeV with the ATLAS detector*, JHEP **1206** (2012) 039, arXiv:1204.2760 [hep-ex].

[43] ATLAS Collaboration Collaboration, G. Aad et al., *Search for resonant WZ production in the WZ to l nu l' l' channel in sqrt(s) = 7 TeV pp collisions with the ATLAS detector*, Phys. Rev. **D85** (2012) 112012, arXiv:1204.1648 [hep-ex].

[44] ATLAS Collaboration Collaboration, G. Aad et al., *Search for pair production of a new quark that decays to a Z boson and a bottom quark with the ATLAS detector*, Phys.Rev.Lett. (2012) , arXiv:1204.1265 [hep-ex].

[45] ATLAS Collaboration Collaboration, G. Aad et al., *Search for the decay $B_s^0 \to \mu\mu$ with the ATLAS detector*, Phys.Lett. **B713** (2012) 387–407, arXiv:1204.0735 [hep-ex].

[46] ATLAS Collaboration Collaboration, G. Aad et al., *Search for events with large missing transverse momentum, jets, and at least two tau leptons in 7 TeV proton-proton collision data with the ATLAS detector*, Phys.Lett. **B714** (2012) 180–196, arXiv:1203.6580 [hep-ex].

[47] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the WW cross section in sqrt(s) = 7 TeV pp collisions with the ATLAS detector and limits on anomalous gauge couplings*, Phys.Lett. **B712** (2012) 289–308, arXiv:1203.6232 [hep-ex].

[48] ATLAS Collaboration Collaboration, G. Aad et al., *Search for supersymmetry in pp collisions at sqrt(s) = 7 TeV in final states with missing transverse momentum and b-jets with the ATLAS detector*, Phys.Rev. **D85** (2012) 112006, arXiv:1203.6193 [hep-ex].

[49] ATLAS Collaboration Collaboration, G. Aad et al., *Search for gluinos in events with two same-sign leptons, jets and missing transverse momentum with the ATLAS detector in pp collisions at sqrt(s) = 7 TeV*, Phys.Rev.Lett. **108** (2012) 241802, arXiv:1203.5763 [hep-ex].

[50] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the top quark mass with the template method in the $t\bar{t} \to$ lepton + jets channel using ATLAS data*, Eur.Phys.J. **C72** (2012) 2046, arXiv:1203.5755 [hep-ex].

[51] ATLAS Collaboration Collaboration, G. Aad et al., *Search for heavy neutrinos and right-handed W bosons in events with two leptons and jets in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector*, Eur.Phys.J. **C72** (2012) 2056, arXiv:1203.5420 [hep-ex].

[52] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of $t\bar{t}$ production with a veto on additional central jet activity in pp collisions at sqrt(s) = 7 TeV using the ATLAS detector*, Eur.Phys.J. **C72** (2012) 2043, arXiv:1203.5015 [hep-ex].

[53] ATLAS Collaboration Collaboration, G. Aad et al., *Jet mass and substructure of inclusive jets in sqrt(s) = 7 TeV pp collisions with the ATLAS experiment*, JHEP **1205** (2012) 128, arXiv:1203.4606 [hep-ex].

[54] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the charge asymmetry in top quark pair production in pp collisions at sqrt(s) = 7 TeV using the ATLAS detector*, Eur.Phys.J. **C72** (2012) 2039, arXiv:1203.4211 [hep-ex].

[55] ATLAS Collaboration Collaboration, G. Aad et al., *Observation of spin correlation in $t\bar{t}$ events from pp collisions at sqrt(s) = 7 TeV using the ATLAS detector*, Phys.Rev.Lett. **108** (2012) 212001, arXiv:1203.4081 [hep-ex].

[56] ATLAS Collaboration Collaboration, G. Aad et al., *Determination of the strange quark density of the proton from ATLAS measurements of the $W \to l\nu$ and $Z \to ll$ cross sections*, Phys.Rev.Lett. **109** (2012) 012001, arXiv:1203.4051 [hep-ex].

[57] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of inclusive two-particle angular correlations in pp collisions with the ATLAS detector at the LHC*, JHEP **1205** (2012) 157, arXiv:1203.3549 [hep-ex].

[58] ATLAS Collaboration Collaboration, G. Aad et al., *Search for second generation scalar leptoquarks in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector*, arXiv:1203.3172 [hep-ex].

[59] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the production cross section of an isolated photon associated with jets in proton-proton collisions at sqrt(s) = 7 TeV with the ATLAS detector*, Phys.Rev. **D85** (2012) 092014, arXiv:1203.3161 [hep-ex].

[60] ATLAS Collaboration Collaboration, G. Aad et al., *Forward-backward correlations and charged-particle azimuthal distributions in pp interactions using the ATLAS detector*, JHEP **1207** (2012) 019, arXiv:1203.3100 [hep-ex].

[61] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the azimuthal anisotropy for charged particle production in $\sqrt{(}s_{NN}) = 2.76$ TeV lead-lead collisions with the ATLAS detector*, Phys.Rev. **C86** (2012) 014907, arXiv:1203.3087 [hep-ex].

[62] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the polarisation of W bosons produced with large transverse momentum in pp collisions at sqrt(s) = 7 TeV with the ATLAS experiment*, Eur.Phys.J. **C72** (2012) 2001, arXiv:1203.2165 [hep-ex].

[63] ATLAS Collaboration Collaboration, G. Aad et al., *Search for a light Higgs boson decaying to long-lived weakly-interacting particles in proton-proton collisions at sqrt(s) = 7 TeV with the ATLAS detector*, Phys.Rev.Lett. **108** (2012) 251801, arXiv:1203.1303 [hep-ex].

[64] ATLAS Collaboration Collaboration, G. Aad et al., *Single hadron response measurement and calorimeter jet energy scale uncertainty with the ATLAS detector at the LHC*, arXiv:1203.1302 [hep-ex].

[65] ATLAS Collaboration Collaboration, G. Aad et al., *Search for new particles decaying to ZZ using final states with leptons and jets with the ATLAS detector in sqrt(s) = 7 Tev proton-proton collisions*, Phys.Lett. **B712** (2012) 331–350, arXiv:1203.0718 [hep-ex].

[66] ATLAS Collaboration Collaboration, G. Aad et al., *Search for FCNC single top-quark production at sqrt(s) = 7 TeV with the ATLAS detector*, Phys.Lett. **B712** (2012) 351–369, arXiv:1203.0529 [hep-ex].

[67] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the azimuthal ordering of charged hadrons with the ATLAS detector*, arXiv:1203.0419 [hep-ex].

[68] ATLAS Collaboration Collaboration, G. Aad et al., *Search for down-type fourth generation quarks with the ATLAS detector in events with one lepton and hadronically decaying W bosons*, Phys.Rev.Lett. **109** (2012) 032001, arXiv:1202.6540 [hep-ex].

[69] ATLAS Collaboration Collaboration, G. Aad et al., *Search for same-sign top-quark production and fourth-generation down-type quarks in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector*, JHEP **1204** (2012) 069, arXiv:1202.5520 [hep-ex].

[70] ATLAS Collaboration Collaboration, G. Aad et al., *Measurement of the cross section for top-quark pair production in pp collisions at sqrt(s) = 7 TeV with the ATLAS detector using final states with two high-pt leptons*, JHEP **1205** (2012) 059, arXiv:1202.4892 [hep-ex].

[71] ATLAS Collaboration Collaboration, G. Aad et al., *Search for anomaly-mediated supersymmetry breaking with the ATLAS detector based on a disappearing-track signature in pp collisions at sqrt(s) = 7 TeV*, Eur.Phys.J. **C72** (2012) 1993, arXiv:1202.4847 [hep-ex].

[72] ATLAS Collaboration Collaboration, G. Aad et al., *Search for pair-produced heavy quarks decaying to Wq in the two-lepton channel at sqrt(s) = 7 TeV with the ATLAS detector*, Phys.Rev. **D86** (2012) 012007, arXiv:1202.3389 [hep-ex].

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