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# PUBLICATION LIST – ALAN J BARR

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## JOURNAL PUBLICATIONS

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*Papers to which I have made a significant and direct contribution*

### ON TESTING THE FOUNDATIONS OF QUANTUM THEORY

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1. C Altomonte and **A. J. Barr**, “Quantum state-channel duality applied to particle physics”, submitted to PLB  
<https://ora.ox.ac.uk/objects/uuid:305b89aa-959c-4544-af43-8969fc4bdb31>  
**Describing a framework for performing quantum computations of high-energy processes**
2. Rachel Ashby-Pickering, **Alan J. Barr**, Agnieszka Wierchucka, “Quantum state tomography, entanglement detection and Bell violation prospects in weak decays of massive particles”, arXiv:2209.13990, JHEP 05 (2023) 020  
**A general method for measuring the full spin density matrix of quantum processes involving weak decays, with examples in WW, WZ and ZZ systems**
3. **A.J. Barr**, P. Caban, J. Rembielinski, “Bell-style inequalities for systems of relativistic vector bosons”, arXiv:2204.11063, Quantum 7, 1070 (2023)  
**Analytical calculations of Bell inequalities in relativistic quantum field theory for vector bosons**
4. **A.J. Barr**, “Testing Bell inequalities in Higgs boson decays”, arXiv:2106.01377, Phys.Lett. **B825** (2022) 136866.  
**Showing that quantum Bell inequalities can be explored using Higgs bosons and  $H \rightarrow WW$  decays, and how they may be tested against classical bounds**

### ON NEW PHYSICS FACILITIES

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5. J.L. Feng et. al., “The Forward Physics Facility at the High-Luminosity LHC”, *J. Phys. G: Nucl. Part. Phys.* **50** 030501, arXiv:2203.05090  
**Snowmass white paper describing a new set of experimental facilities proposed for the Large Hadron Collider, including the FASER-2 experiment. Topcite 100+.**

### ON PHYSICS STUDIES AT ATLAS AND THE LHC

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6. (**A.J. Barr** chair of Ed. Board) “Search for new phenomena in events with two opposite-charge leptons and missing transverse energy in  $pp$  collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector”, arXiv:2102.01444, JHEP 04 (2021) 165  
**Highly sensitive search to top squarks, Dark Matter produced in association with top quarks, and invisible Higgs boson decays. Topcite 50+**

7. ATLAS Collaboration, (**A.J. Barr** Ed. Board) “Search for squarks and gluinos in final states with an isolated lepton, jets, and missing transverse momentum at  $\sqrt{s}=13$  TeV with the ATLAS detector”, arXiv:2101.01629, submitted to EPJC
8. ATLAS Collaboration (**A.J. Barr** Editor) “Search for new phenomena in final states with large jet multiplicities and missing transverse momentum using  $\sqrt{s}=13$  TeV proton-proton collisions recorded by ATLAS at Run-2 of the LHC”, arXiv:2008.06032, JHEP 10 (2020) 062  
**First use of particle-flow jets and of  $E_{T\text{miss}}$  significance in an ATLAS SUSY search**
9. ATLAS Collaboration, “Operation of the ATLAS trigger system in Run 2”, arXiv:2007.12539, 2020\_JINST\_15\_P10004 **Topcite 100+**.
10. ATLAS Collaboration (**A.J. Barr** editor) “Performance of the missing transverse momentum triggers for the ATLAS detector during Run 2 data taking”, arXiv:2005.09554, JHEP 08 (2020) 80  
**The received wisdom from previous colliders was that this trigger would be impossible to operate with pileup in high luminosity conditions. This paper describes how the trigger, which is central to much of the ATLAS physics programme, was made to operate at high efficiency even in this very difficult environment. Topcite 50+**
11. ATLAS Collaboration, (**A.J. Barr** Ed. Board) “Search for direct production of electroweakinos in final states with one lepton, missing transverse energy and a Higgs boson decaying into two  $b$ -jets in  $pp$  collisions at  $\sqrt{s}=13$  TeV with the ATLAS detector”, arXiv:1909.09226, Eur. Phys. J. C 80 (2020) 691 **Topcite 50+**.
12. ATLAS Collaboration, “Performance of missing transverse momentum reconstruction with the ATLAS detector using proton-proton collisions at  $\sqrt{s}=13$  TeV”, Eur. Phys. J. C 78 (2018) 903, arXiv:1802.08168 **Topcite 500+**.
13. ATLAS Collaboration, “Search for electroweak production of supersymmetric states in scenarios with compressed mass spectra at  $\sqrt{s}=13$  TeV with the ATLAS detector”, arXiv:1712.08119, Phys. Rev. D **97**, 052010  
**New sensitivity to both Higgsino Dark Matter and to Bino Dark Matter with Slepton Coannihilation for the first time since LEP. ATLAS physics highlight<sup>1</sup>. Exploits the method proposed by Barr and Scoville [25]. Topcite 100+.**
14. ATLAS Collaboration (**A.J. Barr** chair of Ed Board) ‘Search for direct top squark pair production in final states with two leptons in  $\sqrt{s}=13$  TeV  $pp$  collisions with the ATLAS detector’, arXiv:1708.03247, Eur.Phys.J. C (2017) **77**:898  
**A combined search covering a wide range of possible top-squark decays. Topcite 100+**
15. ATLAS Collaboration, ‘Search for new phenomena with large jet multiplicities and missing transverse momentum using large-radius jets and flavour-tagging at ATLAS in 13 TeV  $pp$  collisions’, 1708.02794, JHEP12 (2017) 034  
**A search using jet reclustering techniques to look for decays of heavy objects**

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<sup>1</sup> <https://atlas.cern/updates/physics-briefing/squeezing-sleptons-lhc>

16. **A.J.Barr** and J. Liu, ‘Complementarity of recent 13 TeV supersymmetry searches and dark matter interplay in the pMSSM’, arXiv:1608.05379, Eur. Phys. J. C (2017) 77:202  
**Showing how different LHC searches have impacted the space of allowed Dark Matter models**
17. ATLAS Collaboration (**A.J.Barr** chair of Ed Board) ‘Dark Matter interpretations of ATLAS searches for the electroweak production of supersymmetric particles in  $\sqrt{s} = 8$  TeV proton-proton collisions’, arXiv:1608.00872, JHEP09(2016)175  
**Showing the LHC experiments’ high sensitivity to supersymmetric Dark Matter – even when strongly interacting particles are heavy**
18. ATLAS Collaboration (**A.J.Barr** editor of MET trigger section) ‘Performance of the ATLAS Trigger System in 2015’, arXiv:1611.09661, Eur. Phys. J. C 77 (2017) 317  
**Describing the selection algorithms used for recording all high-energy ATLAS data. Topcite 1000+**
19. **A.J.Barr** and J. Liu, ‘First interpretation of 13 TeV supersymmetry searches in the pMSSM’, arXiv:1605.09502, published with arXiv:1608.05379 in Eur. Phys. J. C (2017) 77:202  
**The first overview of the early 13 TeV LHC SUSY searches in the more general MSSM**
20. ATLAS Collaboration, (**A.J.Barr** editor) ‘Search for new phenomena in final states with large jet multiplicities and missing transverse momentum with ATLAS using  $\sqrt{s}=13$  TeV proton--proton collisions’, arXiv:1602.06194, Phys.Lett. **B757** (2016) 334-355 **Topcite 50+**  
**The first LHC Supersymmetry search paper from LHC Run-2**
21. ATLAS Collaboration, (**A.J.Barr** editor) ‘Measurement of four-jet differential cross sections in  $\sqrt{s} = 8$  TeV proton-proton collisions using the ATLAS detector’, arXiv:1509.07335, JHEP12(2015)105.  
**A detailed study of the kinematics of multi-jet events, and of the Monte Carlo event generators that model them**
22. ATLAS Collaboration, ‘ATLAS Run 1 searches for direct pair production of third-generation squarks at the Large Hadron Collider’, arXiv:1506.08616, Eur. Phys. J. C75 (2015) 510. **Topcite 200+**
23. ATLAS Collaboration, ‘Summary of the searches for squarks and gluinos using  $\sqrt{s} = 8$  TeV pp collisions with the ATLAS experiment at the LHC’, arXiv:1507.05525, JHEP 2015(10) 01. **Topcite 200+**
24. ATLAS Collaboration, (**A.J.Barr** editor) ‘Summary of the ATLAS experiment’s sensitivity to supersymmetry after LHC Run 1 - interpreted in the phenomenological MSSM’, JHEP10(2015)134, arXiv:1508.06608, ATLAS-SUSY-2014-08.  
**The most comprehensive analysis of Run-1 SUSY searches, considering 22 different search papers and more than 300,000 pMSSM models. Selected by the ATLAS Collaboration as a “Physics highlight”<sup>i</sup>. Featured on Résonances blog<sup>ii</sup>, and in the CERN courier (Nov 2015). Plots used in the Particle Data Group summary. Topcite 200+**
25. **A.J.Barr** and J. Scoville, ‘A boost for the EW SUSY hunt: monojet-like search for compressed sleptons at LHC14 with  $100 \text{ fb}^{-1}$ ’, arXiv:1501.02511, JHEP 04(2015) 147.  
**Demonstrating that sleptons can be discovered at the LHC even in the difficult case of compressed mass-spectra [method later used by ATLAS & CMS]**

26. ATLAS Collaboration, (**A.J.Barr** editor) ‘*Search for Scalar Charm Quark Pair Production in pp Collisions at  $\sqrt{s}=8$  TeV with the ATLAS Detector*’, arXiv:1501.01325. Phys. Rev Lett. **114** 161801 (2015)  
**The first dedicated search for scalar charm production at a Hadron Collider. Selected by the ATLAS Collaboration as a “Physics highlight”<sup>iii</sup>. Topcite 50+**
27. **A.J. Barr**, et. al., ‘*Higgs Self-Coupling Measurements at a 100 TeV Hadron Collider*’, arXiv:1412.7154, JHEP 1502(2015)016. **Exploring one of the main physics motivations for a future high-energy (~100 TeV) hadron collider. Topcite 100+**
28. **A.J. Barr**, M.J. Dolan, C. Englert, M. Spannowsky, ‘*Di-Higgs final states augMT2ed – selecting hh events at the high-luminosity LHC*’, arXiv:1309.6318, Phys. Lett. B728 p306 (2014).  
**Demonstrating that the high-luminosity-LHC can measure the Higgs field’s self-coupling. Topcite 100+**
29. ATLAS Collaboration, ‘*Search for direct third-generation squark pair production in final states with missing transverse momentum and two b-jets in  $\sqrt{s}=8$  TeV pp collisions with the ATLAS detector*’, JHEP 1310 (2013) 189, arXiv:1308.2631  
**World-leading sensitivity to sbottom squarks. Topcite 200+**
30. ATLAS Collaboration, (**A.J.Barr** editor) ‘*Search for new phenomena in final states with large jet multiplicities and missing transverse momentum at  $\sqrt{s}=8$  TeV proton-proton collisions using the ATLAS experiment*’, arXiv:1308.1841, JHEP10(2013)130.  
**The first ATLAS Supersymmetry search analysis of the complete 8 TeV data set, sensitive to squarks and gluinos. Topcite 200+**
31. **A.J. Barr**, C.G. Lester ‘*A search for direct heffalon production using the ATLAS and CMS experiments at the Large Hadron Collider*’, arXiv:1303.7367  
**Special 1<sup>st</sup> April paper. Used in special exhibition “Collider” at the Science Museum, London**
32. ATLAS Collaboration, ‘*A Particle Consistent with the Higgs Boson Observed with the ATLAS Detector at the Large Hadron Collider*’, Science 338 (2012) 1576-1582, doi:10.1126/science.1232005  
**Higgs boson discovery paper for a broader audience. Topcite 100+.**
33. ATLAS Collaboration (**A.J.Barr** chair of ed. board) ‘*Search for R-parity-violating supersymmetry in events with four or more leptons in  $\sqrt{s} = 7$  TeV pp collisions with the ATLAS detector*’, arXiv:1210.4457, JHEP 12 (2012) 124
34. ATLAS Collaboration, ‘*Observation of a new particle in the search for the Standard Model Higgs Boson with the ATLAS detector at the LHC*’, arXiv:1207.7214, Phys.Lett. B716 (2012) 1-29  
**Higgs boson discovery paper. Topcite 10,000+.**
35. ‘*Search for squarks and gluinos with the ATLAS detector in final states with jets and missing transverse momentum using 4.7 fb<sup>-1</sup> of  $\sqrt{s}=7$  TeV proton-proton collision data*’, arXiv: 1208.0949 , Phys.Rev. D87 (2013) 012008, **Topcite 250+**
36. ATLAS Collaboration (**A.J.Barr** editor) ‘*Hunt for new phenomena using large jet multiplicities and missing transverse momentum with ATLAS in 4.7 fb<sup>-1</sup> of  $\sqrt{s} = 7$  TeV proton-proton collisions*’ arXiv:1206.1760, JHEP **1207** (2012) 167. **Topcite 100+**

37. S. Kraml et al. "Searches for New Physics: Les Houches Recommendations for the Presentation of LHC Results", arXiv:1203.2489, Eur.Phys.J. C72 (2012) 1976
38. **A.J.Barr**, B. Gripaios, C.G. Lester, "Finding Higgs bosons heavier than  $2m_W$  in dileptonic  $W$  boson decays", arXiv:1110.2452, Phys. Lett. **B 713** (2012) 495–499
39. ATLAS Collaboration (**A.J.Barr** editor) "Search for new phenomena in final states with large jet multiplicities and missing transverse momentum using  $\sqrt{s} = 7$  TeV pp collisions with the ATLAS detector", JHEP **1111** (2011) 099  
**Search with very large jet multiplicities ( $\geq 6$ ,  $\geq 7$  and even  $\geq 8$  jets) – highlighted in CERN courier article <http://cerncourier.com/cws/article/cern/49340>. Topcite 100+**
40. ATLAS Collaboration, "Search for squarks and gluinos using final states with jets and missing transverse momentum with the ATLAS detector in  $\sqrt{s} = 7$  TeV proton-proton collisions", Phys.Lett. B710 (2012) 67-85 **Topcite 250+**.
41. **A.J. Barr**, B. Gripaios, C.G. Lester "Re-weighing the evidence for a Higgs boson in dileptonic  $W$ -boson decays", PRL **108** (2012) 041803
42. **A. J. Barr**, S. T. French, J. A. Frost, C. G. Lester "Speedy Higgs boson discovery in decays to tau lepton pairs", JHEP **1110** (2011) 080  
**A fast, effective projection. Factor of up to ~2 improved sensitivity or factor of better than 2000 reduction in computational expense compared to previous proposals**
43. B. Allanach, **A.J. Barr**, A. Dafinca, C. Gwenlan, "Discovery reach for generic supersymmetry at the LHC:  $M_{T2}$  versus missing transverse momentum selections for pMSSM searches", JHEP 1107:104 (2011).  
**LHC crystal-ball gazing & Supersymmetry search strategies**
44. **A.J. Barr**, P.Konar, K. Matchev, M.Park, C.G. Lester, T.J. Khoo, "A guide to transverse projections and mass-constraining variables", Phys.Rev.D84(2011)095031  
**Long (47-page) introductory article on LHC kinematics containing a mixture of pedagogy and various proofs. Topcite 100+**
45. ATLAS Collaboration (**A.J. Barr** editor) "Search for squarks and gluinos using final states with jets and missing transverse momentum with the ATLAS detector in  $\sqrt{s} = 7$  TeV proton-proton collisions" accepted by Physics Letters **B701** (2011) 186–203  
**The most sensitive LHC Supersymmetry search paper of early 2011. The implications of this paper are discussed in Nature News (doi:10.1038/471013a), New Scientist, Oxford Science Blog, SlashDot and Symmetry magazine. Topcite 250+**
46. ATLAS Collaboration "Search for supersymmetry using final states with one lepton, jets, and missing transverse momentum with the ATLAS detector in  $\sqrt{s} = 7$  TeV pp collisions", PRL **106**, 131802 (2011)  
**The first ATLAS Supersymmetry search paper. Selected for an editorial "Viewpoint in Physics" by PRL (doi:10.1103/Physics.4.27) Topcite 100+**
47. ATLAS Collaboration "Performance of the ATLAS Detector using First Collision Data", JHEP 1009:056,2010 **Topcite 100+**
48. **A.J. Barr**, C. Gwenlan, C.G. Lester, C.J.S. Young "A comment on 'Amplification of endpoint structure for new particle mass measurement at the LHC'", Phys Rev **D.81** 118701 (2011)

49. **A.J. Barr**, C.G. Lester, “A review of the mass measurement techniques proposed for the Large Hadron Collider”, J. Phys. G: Nucl. Part. Phys. 37 (2010) 123001.  
**Review of 189 papers (72 pages). Topcite 50+. The classification and implications have been widely presented at e.g. CERN TH, and ICHEP-2010, Paris**
50. **A.J. Barr**, B. Gripaios, C.G. Lester, “Transverse masses and kinematic constraints: from the boundary to the crease”, J. High Energy Phys. **0911**:096 (2009).  
**New kinematic approach to searches. Method adopted by ATLAS and CMS collaborations. Topcite 100+**
51. **A.J. Barr**, C. Gwenlan, “The race for supersymmetry: using  $m_{T2}$  for discovery”, arXiv:0907.2713, Phys Rev **D.80**, 074007 (2009)  
**New kinematic approach to SUSY searches. Method adopted by ATLAS and CMS collaborations. Topcite 50+**
52. **A.J. Barr**, B. Gripaios, C.G. Lester, “Measuring the Higgs boson mass in dileptonic W-boson decays at hadron colliders”, JHEP**07**(2009)072  
**New kinematic method proposed. Adopted by ATLAS for the LHC’s most sensitive Higgs boson (WW) search. Topcite 50+**
53. **A.J. Barr**, A. Pinder, M. Serna, “The Precision determination of invisible-particle masses at the CERN LHC: II”, arXiv:0811.2138, Phys.Rev.**D.79**,074005,2009 (2009)  
**Precision measurements in leptonic cascade decays to WIMPs. Topcite 50+**
54. **A.J. Barr**, G.G. Ross, M. Serna, “The Precision Determination of invisible-particle masses at the LHC”, Phys.Rev.**D78**:056006,2008  
**Showing how to obtain GeV-scale WIMP mass measurements in leptonic 3-body decays. Topcite 50+**
55. **A.J. Barr**, B. Gripaios, C.G. Lester, “Weighing wimps with kinks at colliders: invisible particle mass measurements from endpoints”, J. High Energy Phys **0802** (2008) 014.  
**Describes a general method of measuring the mass of invisible particles produced at the LHC. Topcite 100+.**
56. C.G. Lester, **A.J. Barr**, “MTGEN: mass scale measurements in pair-production at colliders”, J. High Energy Phys. **0712** (2007) 102.  
**General mass determination methods in complicated cascade decays. Topcite 100+**
57. **A.J. Barr** “Measuring slepton spin at the LHC”, J. High Energy Phys. **0602** (2006) 042.  
**A method of measuring SUSY particle spin at the LHC which does not require parity-violating decays. Topcite 100+**
58. **A.J. Barr** “Determining the spin of supersymmetric particles at the LHC using lepton charge asymmetry”, Phys. Lett. B **596** (2004) 205-212.  
**The first paper to propose a method for measuring the spin of supersymmetric particles at the LHC. Topcite 100+**
59. **A.J. Barr**, C.G. Lester, P. Stephens, “A variable for measuring masses at hadron colliders when missing energy is expected;  $M_{T2}$ : the truth behind the glamour”, J. Phys.G. **29** (2003) 2343.  
**Provides the mathematical background to the widely-used kinematical variable Topcite 500+**

60. B.C. Allanach, **A.J. Barr**, C.G. Lester, M.A. Parker, P. Richardson, “*Discovering anomaly-mediated supersymmetry at the LHC*”, J. High Energy Phys. **0303** (2003) 045  
**Proposal for discriminating SUSY breaking mechanisms at the LHC. Topcite 100+**
61. B.C. Allanach, **A.J. Barr**, M.A. Parker, P. Richardson and B.R. Webber “*Extracting the flavour structure of a baryon-number R-parity violating coupling at the LHC*”, J. High Energy Phys. **0109** (2001) 021
62. B.C. Allanach, **A.J. Barr**, L. Drage, C.G. Lester, D. Morgan, M.A. Parker, P. Richardson and B.R. Webber “*Measuring supersymmetric particle masses at the LHC in scenarios with baryon-number R-parity violating couplings*”, J. High Energy Phys. **0103** (2001) 048  
**Methods for gaining sensitivity to one of the most difficult signatures of new physics at the LHC**

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### ON SILICON MICROSTRIP DETECTORS

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63. The ATLAS collaboration, “*The ATLAS Inner Detector commissioning and calibration*”, **Eur.Phys.J.C70:787-821,2010.**  
**Cosmic ray and charge-injection in-situ commissioning. Topcite 100+**
64. E. Abat et al. “*Combined performance tests before installation of the ATLAS Semiconductor and Transition Radiation Tracking Detectors*”, JINST 3:**P08003**,2008 **Topcite 50+**
65. A. Abdesselam et al. “*Engineering for the ATLAS SemiConductor Tracker (SCT) End-cap*”, JINST 3:**P05002**, 2008
66. A.Ahmad et al. “*Alignment of the Pixel and SCT Modules for the 2004 ATLAS Combined Test Beam*”, JINST 3:**P09004**,2008
67. A. Abdesselam et al. “*The detector control system of the ATLAS SemiConductor tracker during macro-assembly and integration*”, JINST 3:**P02007**,2008.
68. A. Abdesselam et al. (Editor **A.J. Barr**), “*The Data Acquisition and Calibration System for the ATLAS Semiconductor Tracker*” JINST 3:**P01003** ,2008  
**Description of the calibration, control and data acquisition system for the ATLAS detector subsystem: project led by AJB during the construction and commissioning phase**
69. A. Abdesselam et al. “*The optical links of the ATLAS SemiConductor tracker*”, JINST 2:**P09003**,2007 **Topcite 50+**
70. A. Ahmad et al, “*The Silicon microstrip sensors of the ATLAS semiconductor tracker*”, Nuclear Instruments and Methods **A578**:98-118, 2007
71. A. Abdesselam et al, “*The Barrel Modules of the ATLAS SemiConductor Tracker*”, Nuclear Instruments and Methods **A568** (2006) 642-671 **Topcite 100+**
72. The ATLAS Semiconductor Tracker collaboration, “*Design and performance of the ABCD3TA ASIC for readout of silicon strip detectors in the ATLAS semiconductor tracker*” Nuclear Instruments and Methods A **552** (2005) pp292-328 **Topcite 100+**
73. The ATLAS Semiconductor Tracker collaboration, “*Beam tests of ATLAS SCT silicon strip detector modules*”, Nuclear Instruments and Methods A **538** (2005) pp384-407. **Topcite 50+**

74. ATLAS and CMS Collaborations, “*High Transverse Momentum Physics at the Large Hadron Collider*”, Eur. Phys. J. direct **C4** (2002)
75. L. Feld et. al. “*R&D for the CMS Silicon Tracker*”, Nucl.Phys.Proc.Suppl.**78**:322-328, (1999)

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### ATLAS COLLABORATION PAPERS

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76. ATLAS Collaboration, “*The ATLAS experiment at the CERN Large Hadron Collider*”. JINST 3:S08003,2008. **Topcite 10,000+**  
**The ATLAS detector paper**

A list of all ATLAS collaboration publications on which I am named as an author (a subset of which is included above) may be found at <http://inspirebeta.net/search?ln=en&p=atlas+barr>

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### OTHER PUBLICATIONS

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#### REVIEW PAPER (PEER REVIEWED)

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77. **A.J. Barr**, C.G. Lester, “*A review of the mass measurement techniques proposed for the Large Hadron Collider*”, arXiv:1004.2732, J. Phys. G: Nucl. Part. Phys. 37 (2010) 123001. **Topcite 100+**

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#### EDUCATION & ENGAGEMENT PAPERS

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78. **A.J. Barr (Editor)**, “*Proceedings of the First Higgs Hunters Schools’ Conference*”, Oxford, June 2018, ATL-OREACH-PROC-2019-002 <https://cds.cern.ch/record/2676777>  
**Conference proceedings authored by 14 UK school pupils, in collaboration with the Institute for Research in Schools. The pupils present their independent research on ATLAS data using the Higgs Hunters for Schools project**
79. **A.J. Barr**, A. Haas, C.W. Kalderon, “*Citizen Scientist Community Engagement with the HiggsHunters project at the Large Hadron Collider*” arXiv:1711.05148, *Research for All, Volume 2, Number 2, July 2018, pp. 359-373(15)*  
**Involving more than 37,000 members of the public from more than 170 countries. Showing that citizen scientists developed their own technical language when searching for new physics in ATLAS event displays.**
80. **A.J. Barr**, A. Haas, C.W. Kalderon, “*That looks weird – evaluating citizen scientists’ ability to detect unusual features in ATLAS images of LHC collisions*”, arXiv:1610.02214  
**Showing that citizen scientists can collectively out-perform computer algorithms at secondary-vertex identification of heavy particles**
81. **A.J. Barr**, C. Boddy, “*The ATLAS detector on a smartphone*”, 2012 Phys. Educ. 47 270.  
**Smart-phone application: released through Android Marketplace. >50,000 downloads, and an average 4.8/5\* user review rating, attracting comments like “Glorious beyond words”, and “Geekgasm-tacular-extravaganza”**



## BOOKS (NOT PEER REVIEWED)

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82. The ATLAS Collaboration, (**A.J.Barr** editor of Supersymmetry chapter) “*Expected Performance of the ATLAS Experiment - Detector, Trigger and Physics*”, ISBN: 978-92-9083-321-5, CERN-OPEN-2008-020 (2008), arXiv:0901.0512 **Topcite 1000+**  
**Describes in detail the analyses expected to be performed with the early ATLAS data**
83. Rattigan et al, “*The Language of Symmetry*”, ISBN 978-1032303949, Routledge 2023.  
**A.J.Barr author of Chapter 3**

## INTERNATIONAL CONFERENCE NOTES, TALKS AND PROCEEDINGS

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84. ATLAS Collaboration (**A.J.Barr** spokespersons representative), “*Observation of quantum entanglement in top-quark pair production using pp collisions of  $\sqrt{s} = 13$  TeV with the ATLAS detector*”, ATLAS-CONF-2020-047
85. ATLAS Collaboration (**A.J.Barr** subgroup convenor), “ATLAS Run 2 searches for electroweak production of supersymmetric particles interpreted within the pMSSM” ATLAS-CONF-2023-055
86. ATLAS Collaboration (**A.J.Barr** editorial board), “*Search for squarks and gluinos in final states with an isolated lepton, jets, and missing transverse momentum at  $\sqrt{s} = 13$  TeV with the ATLAS detector*”, ATLAS-CONF-2020-047
87. ATLAS Collaboration (**A.J.Barr** chair of the editorial board), “*Search for new phenomena in events with two opposite-charge leptons and missing transverse energy in pp collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector*”, ATLAS-CONF-2020-046
88. ATLAS Collaboration, “*Search for new phenomena in final states with large jet multiplicities and missing transverse momentum using  $\sqrt{s} = 13$  TeV proton-proton collisions recorded by ATLAS at Run-2 of the LHC  $\sqrt{s} = 13$  TeV pp collisions with the ATLAS detector*”, ATLAS-CONF-2020-002
89. ATLAS Collaboration, “*Search for direct production of electroweakinos in final states with one lepton, missing transverse energy and a Higgs boson decaying into two b-jets in pp collisions at  $\sqrt{s} = 13$  TeV with the ATLAS detector*”, ATLAS-CONF-2019-031
90. ATLAS Collaboration, “*Searches for electroweak production of supersymmetric particles with compressed mass spectra in  $\sqrt{s} = 13$  TeV pp collisions with the ATLAS detector*”, ATLAS-CONF-2019-014
91. ATLAS Collaboration, (**A.J.Barr** chair of the Editorial Board), “*Search for direct top squark pair production in final states with two leptons in  $\sqrt{s} = 13$  TeV pp collisions with the ATLAS detector*”, ATLAS-CONF-2017-034
92. ATLAS Collaboration (**A.J.Barr** and others led by SUSY Oxford group), “*Search for new phenomena with large jet multiplicities and missing transverse momentum using large-radius jets and flavour-tagging at ATLAS in 13 TeV pp collisions*”, ATLAS-CONF-2017-033
93. ATLAS Collaboration, (**A.J.Barr** Editor), “*Pursuit of new phenomena in final states with high jet multiplicity, high jet masses and missing transverse momentum with ATLAS at  $\sqrt{s} = 13$  TeV*”, ATLAS-CONF-2016-095

94. ATLAS Collaboration, (**A.J.Barr** chair of the Editorial Board) "Search for top-squark pair production in final states with two tau leptons, jets, and missing transverse momentum in  $\sqrt{s} = 13$  TeV proton-proton collisions with the ATLAS detector", ATLAS-CONF-2016-048
95. ATLAS Collaboration, "Search for new phenomena using final states with large jet multiplicities and missing transverse momentum with ATLAS in  $\sqrt{s} = 13$  TeV proton-proton collisions", ATLAS-CONF-2015-077
96. ATLAS Collaboration, "First validation plots in preparation for a search for new phenomena in final states with large jet multiplicities and missing transverse momentum at  $\sqrt{s} = 13$  TeV proton-proton collisions using the ATLAS experiment", ATL-PHYS-PUB-2015-030
97. ATLAS Collaboration (**A.J.Barr** editor) "Search for new phenomena using large jet multiplicities and missing transverse momentum with ATLAS in  $5.8 \text{ fb}^{-1}$  of  $\sqrt{s} = 8$  TeV proton-proton collisions" ATLAS-CONF-2012-103
98. ATLAS Collaboration (**A.J.Barr** editorial board) "Performance of missing transverse momentum reconstruction in ATLAS with 2011 Proton-Proton Collisions at  $\sqrt{s} = 7 \text{ TeV}$ ", ATLAS-CONF-2012-101
99. ATLAS Collaboration (**A.J.Barr** editor) "Hunt for new phenomena using large jet multiplicities and missing transverse momentum with ATLAS in  $L = 4.7 \text{ fb}^{-1}$  of  $\sqrt{s} = 7$  TeV proton-proton collisions" ATLAS-CONF-2012-037
100. ATLAS Collaboration (**A.J.Barr** editorial board) "Performance of the Reconstruction and Identification of Hadronic Tau Decays with ATLAS", ATLAS-CONF-2011-152
101. **A.J. Barr**, "Dark Matter Searches in ATLAS", Invited plenary, Dark Matter Underground and in the Heavens, CERN, July 2011
102. **A.J. Barr**, "The LHC: The story so far", Invited plenary, PASCOS 2011, Cambridge, July 2011
103. ATLAS Collaboration, "Search for squarks and gluinos using final states with jets and missing transverse momentum with the ATLAS detector in  $\sqrt{s} = 7$  TeV proton-proton collisions", ATLAS-CONF-2011-086 (2011)
104. ATLAS Collaboration, "Combined exclusion reach of 0 and 1 lepton + jets +  $E_T^{\text{miss}}$  searches", ATLAS-CONF-2011-064 (2011)
105. **A.J. Barr**, "What's happening at the LHC", Invited plenary, Darkness Visible, Cambridge, August 2010
106. C.G. Lester (**A.J. Barr** co-author) "A Review of the Mass Measurement Techniques proposed for the Large Hadron Collider", ICHEP, Paris, July 2010  
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107. ATLAS COLLABORATION, (**A.J. Barr** editor) "Early Supersymmetry searches in channels with jets and missing transverse momentum with the ATLAS detector", July 2010, ATLAS-CONF-2010-065  
**First public LHC Supersymmetry search results (1/2)**
108. ATLAS COLLABORATION, (**A.J. Barr** editor) "Early Supersymmetry searches with jets, missing transverse momentum and one or more leptons with the ATLAS Detector", July 2010, ATLAS-CONF-2010-066  
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109. **A.J. Barr**, “*Finding WIMPs at the LHC*” workshop on Dark Matter, the Large Hadron Collider, and cosmology, Korean Institute of Advanced Study, August 2009
110. **A.J. Barr**, on behalf of the ATLAS and CMS collaborations, “*Dark Matter at the Large Hadron Collider*”, PASCOS 09, Hamburg, July 2009
111. **A.J. Barr**, “*Sparticle Mass Measurements at the LHC*”, BSM-LHC/SUSY 2009, Boston, June 2009.
112. **A.J. Barr**, “*Musings on Measuring Masses*”, Workshop on Measuring Masses and Spins of new particles, IPMU, Tokyo, March 2009.
113. **A.J. Barr**, “*The start-up of the LHC*”, UniverseNet workshop, Oxford, September 2008.
114. **A.J. Barr**, “*Discovering (and understanding) SUSY at the LHC*”, Workshop on TeV Scale Physics and Dark Matter, NORDITA, Stockholm, July 2008.
115. **A.J. Barr**, C. Gwenlan, C.G.Lester “*M<sub>TGen</sub>: Mass scale measurements in pair production at colliders*”, in proceedings “*Physics at TeV Colliders*”, Les Houches, France, June 2007.
116. **A.J. Barr** on behalf of the ATLAS Collaboration, “*Supersymmetry and exotics physics with the ATLAS and CMS experiments*”, invited plenary talk, Particles Strings and Cosmology, PASCOS06, Ohio, September 2006. Invited plenary.
117. **A.J. Barr** on behalf of the ATLAS Collaboration, “*News from ATLAS physics studies*”, Large Hadron Collider – International Linear Collider workshop, CERN, December 2005
118. **A.J. Barr** on behalf of the ATLAS SCT Collaboration, “*Calibrating the ATLAS Semiconductor Tracker Front-End Electronics*”, proceedings of the IEEE Nuclear Science Symposium, Rome, ATL-COM-INDET-2006-001, 2004
119. **A.J. Barr** on behalf of the ATLAS and CMS Collaborations “*Mini-review: Higgs and SUSY at the LHC*”, to be published in the proceedings of the International Conference on High Energy Physics, (ICHEP) Beijing, China, World Scientific, 2004
120. **A.J. Barr** on behalf of the ATLAS Collaboration “*Finding Supersymmetry with the ATLAS experiment at the LHC*”, proceedings of “*SUSY 2003: Supersymmetry in the Desert*”, Tucson, Arizona, World Scientific, 2003
121. **A.J. Barr** “*Finding Anomaly-Mediated Supersymmetry at the LHC*”, proceedings of “*SUSY 2003: Supersymmetry in the Desert*”, Tucson, Arizona, World Scientific, 2003

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122. ATLAS Collaboration, “*ATLAS sensitivity to winos and higgsinos with a highly compressed mass spectrum at the HL-LHC*”, ATL-PHYS-PUB-2018-031
123. ATLAS Collaboration, ‘*Search for direct pair production of higgsinos by the reinterpretation of the disappearing track analysis with  $36.1 \text{ fb}^{-1}$  of  $\sqrt{s}=13 \text{ TeV}$  data collected with the ATLAS experiment*’, ATL-PUB-SUSY-2017-01

124. ATLAS Collaboration ‘Pursuit of new phenomena in final states with high jet multiplicity, high jet masses and missing transverse momentum with ATLAS at  $\sqrt{s} = 13$  TeV’, ATLAS-CONF-2016-095.
125. ATLAS Collaboration, ‘First validation plots in preparation for a search for new phenomena in final states with large jet multiplicities and missing transverse momentum at  $\sqrt{s} = 13$  TeV proton–proton collisions using the ATLAS experiment’, ATL-PHYS-PUB-2015-030. **One of the first ATLAS supersymmetry analyses to show performance results with LHC run 2.**
126. ATLAS Collaboration (**A.J. Barr** editor of Supersymmetry section) “Physics at a High-Luminosity LHC with ATLAS”, ATL-PHYS-PUB-2012-001.
127. **A.J. Barr** et al. “Quest for new phenomena using large jet multiplicities and missing transverse momentum with ATLAS in 20.3/fb of 8 TeV proton-proton collisions : Supporting documentation”, ATL-COM-PHYS-2012-1814
128. **A.J. Barr** et al. “Searches for Supersymmetry at the high luminosity LHC with the ATLAS Detector”, ATL-COM-PHYS-2012-1458
129. **A.J. Barr** et al. “Search for new phenomena using large jet multiplicities and missing transverse momentum with ATLAS in 5.8 fb<sup>-1</sup> of  $\sqrt{s} = 8$  TeV proton-proton collisions — supporting documentation”, ATL-COM-PHYS-2012-964
130. S. Asai et al. “Search for squarks and gluinos using final states with jets and missing transverse momentum with the ATLAS experiment in  $\sqrt{s} = 7$  TeV proton-proton collisions: supporting documentation”, ATL-COM-PHYS-2012-426
131. **A.J. Barr** et al. “Performance assumptions for an upgraded ATLAS detector at a High-Luminosity LHC”, ATL-COM-PHYS-2013-166
132. **A.J. Barr** et al. “Hunt for new phenomena using large jet multiplicities and missing transverse momentum with ATLAS, in  $L=4.7$  fb<sup>-1</sup> of  $\sqrt{s} = 7$  TeV proton- proton collisions - supporting documentation”, ATL-PHYS-INT-2012-052 (2012)
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136. F. Ahles et al. (**A.J. Barr** editor) Details on “Early supersymmetry searches in channels with jets and missing transverse momentum with the ATLAS detector”, ATL-PHYS-INT-2010-082 (2010)
137. **A.J. Barr** et al “Details on ‘Early supersymmetry searches with jets, missing transverse momentum and one or more leptons with the ATLAS Detector”, ATL-PHYS-INT-2010-083 (2010)
138. **A.J. Barr** et al, “Prospects for Higgs Boson Searches using the  $H \rightarrow WW^{(*)} \rightarrow l\nu l\nu$  decay mode with the ATLAS detector for 10 TeV” ATL-COM-PHYS-2010-185 (2010)
139. C.J.S. Young and **A.J. Barr**, “Estimating the QCD Background to SUSY signals by measuring the Jet Transfer Function in Di-Jet data”, ATL-COM-PHYS-2010-160

140. ATLAS Collaboration, “Multi-lepton supersymmetry searches”, ATL-PHYS-PUB-2009-068 (2009)
141. ATLAS Collaboration, “Prospects for supersymmetry discovery based on inclusive searches”, ATL-PHYS-PUB-2009-066 (2009)
142. A. Armbruster et al. “Higgs boson searches using the  $H \rightarrow WW^* \rightarrow ll\nu\nu$  decay mode with the ATLAS Detector”, ATL-COM-PHYS-2009-620 (2009)
143. O. Brandt, **A.J. Barr**, P. Bruckman de Renstrom “Search strategies for Supersymmetry in tri-lepton final states with the ATLAS detector at the Large Hadron Collider” ATL-COM-PHYS-2008-005 (2008)
144. **A. Barr** et al. “Usage of the Distributed Analysis Tools in The ATLAS Supersymmetry Working Group” ATL-SOFT-INT-2007-005 (2007)
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146. **A.J. Barr** et al. “Reflections on the first ATLAS Blind Data Challenge”, ATLAS note ATL-COM-PHYS-2006-038 (2006)
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<sup>ii</sup> <http://resonaances.blogspot.co.uk/2015/08/weekend-plot-susy-limits-rehashed.html>

<sup>iii</sup> <http://atlas-physics-updates.web.cern.ch/atlas-physics-updates/2015/01/09/in-search-of-super-charm/>