ATLAS Collaboration papers

Due to the large nature of experimental collaborations in particle physics, each publication relies on the results of a very large number of individual researchers and technicians. For this reason, the author list of each of the public documents by the ATLAS experiment includes all members of the collaboration, in alphabetical order. My full bibliometric information (Inspire-HEP) can be found at this link. The following list of ATLAS papers has been selected based on their relevance to my past and current research, and my contribution is described below.

1) (2018) Search for low-mass dijet resonances using trigger-level jets with the ATLAS detector in pp collisions at sqrt(s)=13 TeV. G. Aad *et al.* [ATLAS Collaboration]. Phys. Rev. Lett. 121, 081801 (2018), arXiv:1804.03496. *This paper describes the first search using the Trigger Level Analysis technique in ATLAS with the full 2016 LHC dataset, and the world-leading constraints on Dark Matter mediator particles decaying into dijets. I was one of three editors of this paper and one of the main analysers, together with the Lund postdoctoral researcher who is now the analysis contact for the full Run-2 search.*
Journal impact factor (2018): 9.227; citations: 73[1].

2) (2018) Search for low-mass resonances decaying into two jets and produced in association with a photon using pp collisions at sqrt(s) =13 TeV with the ATLAS detector. G. Aad *et al.* [ATLAS Collaboration]. Phys.Lett. B795 (2019) 56-75, arXiv:1901.10917. *This paper describes the first search using the dijet+ISR signature at the ATLAS detector, extending TLA constraints for DM mediators to lower masses. I introduced this search to ATLAS and I was one of three editors of this paper and my student was one of the main analyzers and responsible for the DM interpretation and summary plots.*
Journal impact factor (2018): 4.162; citations: 24.

3) (2017) Performance of the ATLAS Trigger System in 2015. G. Aad *et al.* [ATLAS Collaboration]. Eur. Phys. J. C 77 (2017) 317, arXiv:1611.09661. *The performance of the ATLAS trigger system is described in this paper, including the performance and commissioning of the Trigger Level Analysis. I made the relevant plots for this paper and supervised a number of students who contributed material.*
Journal impact factor: 4.843; citations: 513.

4) (2016) Search for new phenomena in the dijet mass and angular distribution from pp collisions at sqrt(s) = 13 TeV with the ATLAS detector. G. Aad *et al.* [ATLAS Collaboration]. Phys. Let. B754 (2016) 302-322 arXiv:1512.01530 *is the first search publication for the LHC, for the 13 TeV run, setting the strongest constraint at the time on high-mass dijet resonances. I have contributed to many aspects of the analysis, especially on the performance of the highest energy jets used for this search, and supervised the Lund PhD student who was the contact person for this analysis.*
Journal impact factor: 4.162; citations: 203;

5) (2013) Jet energy measurement with the ATLAS detector in proton-proton collisions at sqrt(s)=7 TeV. G. Aad *et al.* [ATLAS Collaboration]. Eur. Phys. J. C **73**, 2304 (2013). *This paper documents the calibration and performance of hadronic jets in the ATLAS detector for the full 2010 LHC dataset, and established many of the techniques that have been used since. This was my thesis topic, and I have been the leading author or the analysis in sections 8-9.*
Journal impact factor: 4.843; citations: 1114.

[1] In High Energy Physics, the number of citations is not as relevant as in other fields, but it is still an indication for the impact on the field and on further papers of the same experiment. For this reason, self-citations are not removed.

6) **(2015) Search for new phenomena in the dijet mass distribution using pp collision data at s=√8 TeV with the ATLAS detector.** G. Aad *et al*. [ATLAS Collaboration]. Phys. Rev. D. 91, 052007 (2015) arXiv:1407:1376 *This paper presents the search for dijet the first search publication for the LHC, for the 13 TeV run, setting the strongest constraint at the time on high-mass dijet resonances. I have contributed to many aspects of the analysis, especially on the performance of the highest energy jets used for this search, and supervised the Lund PhD student who was the contact person for this analysis.*
Journal impact factor: 4.162; citations: 203;

Dark Matter Forum / Working Group papers

In 2014, I was appointed by ATLAS and CMS management to co-lead the Dark Matter Forum and in 2015 the LHC Dark Matter Working Group (~300 members) to disseminate recommendations on the search targets and interpretation of LHC dark matter searches. The Dark Matter Working Group (DMWG, link to mandate) regularly publishes the results of the work of the LHC Dark Matter community in terms of search targets and presentation of results. As one of the working group leaders from 2014-2018 I have been among the 2-5 editors for the four publications, published on Physics of the Dark Universe.

6) **(2015) Dark Matter Benchmark Models for Early LHC Run-2 Searches: Report of the ATLAS/CMS Dark Matter Forum.** A. Abercrombie et al. Phys. Dark Univ. 26 (2019) 100371 arXiv:1507.00966**.** *This document is the final report of the ATLAS-CMS Dark Matter Forum, a forum organized by the ATLAS and CMS collaborations with the participation of theory. It contains DM signal benchmarks early LHC Run-2 searches and studies of their parameter space, and a repository of generator implementation as supplementary material. I have been one of the five organizers and main editors of this paper.*
Journal impact factor: 5.660; citations: 397;

7) **(2016) Recommendations on presenting LHC searches for missing transverse energy signals using simplified s-channel models of dark matter.** A. Albert et al. Phys.Dark Univ. (2019) 100365 arXiv:1603.04156.
8) **(2017) Recommendations of the LHC Dark Matter Working Group: Comparing LHC searches for heavy mediators of dark matter production in visible and invisible decay channels.** A. Albert et al. Phys.Dark Univ. 26 (2019) 100377 arXiv:1703.05703.
These papers contain the DMWG recommendations used by all DM searches for these models, on how to show results of LHC searches together with non-collider searches using the models from Ref. 6), and how how to convey the complementarity of visible/invisible mediator LHC searches. I am the contact editor and author of this document.
Journal impact factor: 5.660; citations: 179/65.

9) **(2018) LHC Dark Matter Working Group: Next generation spin-0 dark matter models.** *This paper describes the phenomenology of an example of a next-generation DM model, called 2HDM+a, that provides the simplest theoretically consistent extension of the DM pseudoscalar simplified model of Ref. 6).*
Journal impact factor: 5.660; citations: 33.

Invited review papers

As an internationally recognised expert in the field, I have been invited to write review articles on the subject area of this proposal. I have also contributed to the European Strategy update, which defines the next 10 years of Europe-wide and international research in HEP, as one of the scientific

secretaries of both the Dark Matter and Beyond the Standard Model Physics Planning Groups with work included in the summary Physics Briefing Book submitted to the European Strategy Group (arXiv:1910.11775).

10) (2017) "Search for dark matter at colliders". Oliver Buchmueller, Caterina Doglioni and Lian-Tao Wang. Published as a Nature Physics Progress Article, Nature Physics **13**, 217–223 (2017), arxiv:1912.12739. *This article reviews the state of dark matter theory and searches at the Large Hadron Collider, concentrating on the weakly interactive massive particle (WIMP) scenario. I am one of the three authors who have been invited by the journal for a special issue of Nature Physics and Nature Astronomy, focused on dark matter.*
Journal impact factor: 20.113, citations: 24, bibliometric information

11) (2018) "Dark Matter Searches at colliders". Antonio Boveia, Caterina Doglioni. Ann.Rev.Nucl.Part.Sci. 68 (2018) 429-459, arXiv:1810.12238. *This is an invited review of dark matter searches at colliders. This is a much broader and longer review than Ref. 8) above, targeting a broad range of audiences (from PhD students to experts in the field), describing the state of the art of collider searches for dark matter, their connections to other experiments and an outlook for the future.* Journal impact factor: 7.7, citations: 35.

High Energy Physics (HEP) Software Foundation whitepaper

As a member of the HEP Software Foundation, I authored its initial whitepaper and its supporting documentation as input to the strategy for trigger and reconstruction for high energy physics for the next decade. Since 2018, I have been selected as convenor of the Trigger and Reconstruction Working Group of the HEP Software Foundation and since 2019 I am part of the coordination group.

12) (2017) "A roadmap for HEP software and computing R&D for the 2020s", A. Alves Jr et al. [HEP Software Foundation]. Comput. Softw. Big Sci. 3 (2019) no.1, 7, arXiv:1712.06982**.** *This whitepaper delineates the R&D activities needed to prepare for the upgrades of the experimental programme of HEP in the coming decades. I have contributed to the main document and chapter on trigger and event reconstruction in terms of real-time analysis. This whitepaper has been the stepping stone for the NSF-funded IRIS-HEP Institute for Research and Innovation in Software in High Energy Physics (http://iris-hep.org).*
Journal impact factor: N/A (new), citations: 50.

Software products

ATLAS Software: All ATLAS trigger and reconstruction software is Open Source (CC-BY4). I was the author of the core code that has made Trigger Level Analysis possible in ATLAS (entry point to the current code at this link), and I made significant contributions to a number of software frameworks for final data analysis.

Dark Matter Working Group repository: As Dark Matter Working Group convener, I ensured that most software products are accessible and versioned by creating a public GitHub community and repository where each software product is indexed on Zenodo (e.g. the dark matter relic density curves for the models considered, to be added to presented results).