



Lauren Tompkins

Associate Professor of Physics

 Curriculum Vitae available Online

CONTACT INFORMATION

• Administrative Contact

Fang Tian - Administrative Associate

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Bio

ACADEMIC APPOINTMENTS

- Associate Professor, Physics

ADMINISTRATIVE APPOINTMENTS

- Fast Tracker Project Leader, ATLAS Experiment, (2017-2019)
- Management Advisory Committee Member, US ATLAS, (2016-2019)
- Diversity and Inclusion Contact, ATLAS Experiment, (2017-2018)

HONORS AND AWARDS

- CAREER Award, National Science Foundation (2016-2021)
- Terman Fellow, Stanford University (2014-2017)

PROFESSIONAL EDUCATION

- PhD, University of California at Berkeley , Physics (2011)
- BA, University of California at Berkeley , Physics and Mathematics (2004)

LINKS

- Tompkins Group Website: http://stanford.edu/group/stanford_atlas/

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Professor Tompkins's research focuses on understanding the relationships which govern matter's most fundamental constituents. As a member of the ATLAS experiment at the Large Hadron Collider (LHC), she utilizes the world's highest energy person-made particle collisions in order to understand the mechanism that gives particles mass, whether or not our current model of elementary particle interactions is a complete description of nature, and if dark matter can be produced and studied in colliders.

In order to search for the exceedingly rare interactions which may provide insight to these questions, the LHC will produce a blistering rate of 50 to 80 proton-proton collisions every 25 nanoseconds in 2015 and beyond. Professor Tompkins works on the design and implementation of custom electronics which will improve the ATLAS experiment's ability to pick out the collisions which produce the Higgs bosons, dark matter particles and other rare events out of the deluge of ordinary interactions. Her group focuses on particles called heavy flavor fermions, the most massive particles not responsible for mediating interactions. Because they are so heavy, they may have a special connection to the origin of mass or physics beyond our current models of particle interactions.

She is additionally a member of the Light Dark Matter Experiment (LDMX), a proposed experiment to produce and detect dark matter in the laboratory utilizing an accelerated beam of electrons, and the Heavy Photon Search Experiment, which searches for visible decays of dark photons.

Please see her group website for a full description of her research activities.

PROJECTS

- ATLAS Experiment at the LHC - CERN
- The Light Dark Matter Experiment (LDMX)
- Heavy Photon Search Experiment

Teaching

COURSES

2025-26

- Citizenship in the 21st Century: COLLEGE 102 (Win)
- Introduction to Particle Physics I: PHYSICS 152, PHYSICS 252 (Spr)
- Survey of Current Topics in Experimental Particle Physics: PHYSICS 253 (Win)

2024-25

- Mechanics: PHYSICS 41 (Aut)

2023-24

- Mechanics: PHYSICS 41 (Win)
- STEMentors in Physics: PHYSICS 41S (Win)

2022-23

- Mechanics: PHYSICS 41 (Win)

STANFORD ADVISEES

Doctoral Dissertation Reader (AC)

Ruben Coronel, Sarah Gaiser, Balint Kurgys, Emrys Peets, Lillian Santos-Olmsted

Postdoctoral Faculty Sponsor

Majd Ghrear

Doctoral Dissertation Advisor (AC)

Elizabeth Berzin, Noe Gonzalez, Sadaf Kadir, Rory O'Dwyer

Publications

PUBLICATIONS

- **Sensitivity of an early dark matter search using the electromagnetic calorimeter as a target for the Light Dark Matter eXperiment** *JOURNAL OF HIGH ENERGY PHYSICS*
Akesson, T., Berzin, E., Bravo, C., Brennan, L., Bryngemark, L., Butti, P., Delzanno, F., Dukes, E., Dutta, V., Echenard, B., Ehrlich, R., Eichlersmith, T., Elen, et al
2025
- **Search for Light Long-Lived Particles in \sqrt{s} =13 TeV Using Displaced Vertices in the ATLAS Inner Detector (vol 133, 161803, 2024)** *PHYSICAL REVIEW LETTERS*
Aad, G., ATLAS Collaboration
2025; 135 (25): 161803
- **Search for decays of the Higgs boson into scalar particles decaying into four or six b quarks using \sqrt{s} =13 TeV with the ATLAS detector** *PHYSICAL REVIEW D*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 112 (7)
- **Evidence for Longitudinally Polarized W Bosons in the Electroweak Production of Same-Sign W Boson Pairs in Association with Two Jets in pp Collisions at \sqrt{s} =13 TeV with the ATLAS Detector.** *Physical review letters*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 135 (11): 111802
- **Azimuthal anisotropies of charged particles with high transverse momentum in Pb plus Pb collisions at $\sqrt{s_{NN}}$ =5.02 TeV with the ATLAS detector** *PHYSICAL REVIEW C*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 112 (2)
- **Measurements of W^+W^- production cross-sections in pp collisions at \sqrt{s} =13 TeV with the ATLAS detector** *JOURNAL OF HIGH ENERGY PHYSICS*
Aad, G., Abbott, B., Abeling, K., Abicht, N. J., Abidi, S. H., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Abusleme Hoffman, A. C., Acharya, B. S., Bourdarios, C., Adamczyk, et al
2025
- **Erratum: Software and computing for Run 3 of the ATLAS experiment at the LHC** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Aakvaag, E., Abbott, B., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Garcia, E., Acharya, et al
2025; 85 (8)
- **Search for new physics in final states with semivisible jets or anomalous signatures using the ATLAS detector** *PHYSICAL REVIEW D*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 112 (1)
- **Search for heavy neutral leptons in decays of W bosons using leptonic and semi-leptonic displaced vertices in \sqrt{s} =13 TeV \sqrt{s} collisions with the ATLAS detector** *JOURNAL OF HIGH ENERGY PHYSICS*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025
- **Search for displaced leptons in \sqrt{s} =13 TeV and 13.6 TeV \sqrt{s} collisions with the ATLAS detector** *PHYSICAL REVIEW D*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Acharya, et al
2025; 112 (1)

- **Search for cascade decays of charged sleptons and sneutrinos in final states with three leptons and missing transverse momentum in $\sqrt{s}=13$ TeV with the ATLAS detector** *PHYSICAL REVIEW D*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 112 (1)
- **Measurement of $W\pm$ -boson differential cross-sections in proton-proton collisions with low pile-up data at $\sqrt{s}=5.02$ TeV and 13 TeV with the ATLAS detector** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 85 (7)
- **Improved reconstruction of highly boosted τ -lepton pairs in the $\pi\pi \rightarrow (\mu\nu_{\mu}v_{\tau})(\text{hadrons} + v_{\tau})$ decay channels with the ATLAS detector** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 85 (6)
- **Measurement of t-channel production of single top quarks and antiquarks in pp collisions at 13 TeV using the full ATLAS Run 2 data sample (vol 2024, 305, 2024)** *JOURNAL OF HIGH ENERGY PHYSICS*
Aad, G., Abbott, B., Abeling, K., Abicht, N. J., Abidi, S. H., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Abusleme Hoffman, A. C., Acharya, B. S., Bourdarios, C., Adamczyk, et al
2025
- **The performance of missing transverse momentum reconstruction and its significance with the ATLAS detector using 140 fb $^{-1}$ of $\sqrt{s}=13$ TeV pp collisions** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Aakvaag, E., Abbott, B., Abeling, K., Abicht, N. J., Abidi, S. H., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Acharya, B. S., Bourdarios, C., Adamczyk, et al
2025; 85 (6)
- **Search for $t\bar{t}H/A \rightarrow t\bar{t}b\bar{b}$ production in proton-proton collisions at $\sqrt{s}=13$ TeV with the ATLAS detector** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Acharya, et al
2025; 85 (5)
- **Observation of $tt[\bar{t}]$ Production in Pb+Pb Collisions at $\sqrt{s_{NN}}=5.02$ TeV with the ATLAS Detector.** *Physical review letters*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abulaiti, Y., Acharya, B. S., Ackermann, et al
2025; 134 (14): 142301
- **Software and computing for Run 3 of the ATLAS experiment at the LHC** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Aakvaag, E., Abbott, B., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Accion Garcia, E., Acharya, et al
2025; 85 (3)
- **Measurement of the associated production of a top-antitop-quark pair and a Higgs boson decaying into a $b\bar{b}$ pair in pp collisions at $\sqrt{s}=13$ TeV using the ATLAS detector at the LHC** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Aakvaag, E., Abbott, B., Abdelhameed, S., Abeling, K., Abicht, N. J., Abidi, S. H., Aboelela, M., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Acharya, et al
2025; 85 (2)
- **Precise measurements of W - and Z -boson transverse momentum spectra with the ATLAS detector using pp collisions at $\sqrt{s}=5.02$ TeV and 13 TeV** *EUROPEAN PHYSICAL JOURNAL C*
Aad, G., Abbott, B., Abeling, K., Abicht, N. J., Abidi, S. H., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Acharya, B. S., Bourdarios, C., Adamczyk, L., Adamek, et al
2024; 84 (10)
- **Potentiality of automatic parameter tuning suite available in ACTS track reconstruction software framework**
Garg, R., Allaire, C., Salzburger, A., Grasland, H., Tompkins, L., Hofgard, E.
edited by Espinal, DeVita, R., Laycock, P., Shadura, O.

E D P SCIENCES.2024

- **Advances in developing deep neural networks for finding primary vertices in proton-proton collisions at the LHC**

Akar, S., Elashri, M., Garg, R., Kauffman, E., Peters, M., Schreiner, H., Sokoloff, M., Tepe, W., Tompkins, L.

edited by Espinal, DeVita, R., Laycock, P., Shadura, O.

E D P SCIENCES.2024

- **Photon-rejection power of the Light Dark Matter eXperiment in an 8 GeV beam** *JOURNAL OF HIGH ENERGY PHYSICS*

Akesson, T., Bravo, C., Brennan, L., Bryngemark, L., Butti, P., Dukes, E., Dutta, V., Echenard, B., Eichlersmith, T., Eisch, J., Elen, E., Ehrlich, R., Froemming, et al

2023

- **Operation and performance of the ATLAS semiconductor tracker in LHC Run 2** *JOURNAL OF INSTRUMENTATION*

Aad, G., Abbott, B., Abbott, D. C., Abud, A., Abeling, K., Abhayasinghe, D. K., Abidi, S. H., Aboulhorma, A., Abramowicz, H., Abreu, H., Abulaiti, Y., Abusleme Hoffman, A. C., Acharya, et al

2022; 17 (1)

- **ATLAS Run 1 searches for direct pair production of third-generation squarks at the Large Hadron Collider** *EUROPEAN PHYSICAL JOURNAL C*

Aad, G., Abbott, B., Abdallah, J., Abidinov, O., Aben, R., Abolins, M., AbouZeid, O. S., Abramowicz, H., Abreu, H., Abreu, R., Abulaiti, Y., Acharya, B. S., Adamczyk, et al

2015; 75 (10)

- **Search for photonic signatures of gauge-mediated supersymmetry in 8 TeV pp collisions with the ATLAS detector** *PHYSICAL REVIEW D*

Aad, G., Abbott, B., Abdallah, J., Abidinov, O., Aben, R., Abolins, M., AbouZeid, O. S., Abramowicz, H., Abreu, H., Abreu, R., Abulaiti, Y., Acharya, B. S., Adamczyk, et al

2015; 92 (7)

- **Measurement of Higgs boson production in the diphoton decay channel in pp collisions at center-of-mass energies of 7 and 8 TeV with the ATLAS detector** *PHYSICAL REVIEW D*

Aad, G., Abbott, B., Abdallah, J., Khalek, S. A., Abidinov, O., Aben, R., Abi, B., Abolins, M., AbouZeid, O. S., Abramowicz, H., Abreu, H., Abreu, R., Abulaiti, et al

2014; 90 (11)