Biographical Sketch: Sally Dawson

Address: Physics Department, Bldg. 510A
Brookhaven National Laboratory
Upton, NY 11793
Email: dawson@bnl.gov

Education

Ph. D in Physics from Harvard University, 1981, under the supervision of H. Georgi

M.A. in Physics from Harvard University, 1978

B.S. in Physics and Mathematics from Duke University, Summa Cum Laude, 1977

Honors and Awards

2019, DOE Distinguished Scientist Fellow

2019, Wess Prize, Karlsruhe Institute of Technology

2019, Sternheim Distinguished Lectureship Award, Amherst College

2017, Sakurai Prize of the APS

2015, Humboldt Fellowship

2014, Ben Lee Fellow, Fermilab

2006, Fellow of the American Association for the Advancement of Science

1998, APS Centennial Speaker

1995, Fellow of the American Physical Society

1995, Town of Brookhaven, Woman of the Year in Science

Professional Experience

2008-present, Senior Scientist, BNL. My primary responsibilities are theoretical research and mentoring young post-doctoral fellows. I am also responsible for providing theoretical guidance to experimental physicists in the BNL physics department. My current research centers around precision calculations for Higgs physics at the LHC,

with the goal of maximizing the information about new physics obtained from the LHC experiments.

2005-2007, Chair, Physics Department, BNL. I was responsible for a 300 person department composed of nuclear and high energy physicists, along with support staff.

2001-present, Adjunct Professor, Yang Institute for Theoretical Physics, Stony Brook University. In this role, I have taught and mentored Stony Brook graduate students.

1998-2004, Group leader, High Energy Theory, BNL. I led a group of roughly 12 theoretical physicists.

1986-2008, Assistant/Associate/Physicist, BNL. My primary responsibilities were original theoretical research in the area of high energy physics.

1983-1986, Research Associate, Lawrence Berkeley Laboratory

1981-1983, Research Associate, Fermilab

Synergistic Professional Activities

Physics Community Working Groups: The high energy physics community periodically convenes large physics studies to help the field formulate future directions. Since 1983, I have contributed and led working groups for over a dozen of these studies. Recently (2014-present), I have been the convenor of the group studying double Higgs production for the LHC Higgs Cross Section Working Group (a group chartered by the CERN laboratory) and in 2013, I was the convenor of the working group studying Higgs physics for the Snowmass Summer Study which provided the major input to the DOE HEP P5 recommendations.

DOE and NSF panels: I spend a significant amount of effort on DOE and NSF review panels. I chaired the 2016 DOE HEP Committee of Visitors, and was a member of the 2014 NSF Committee of Visitors. I was a member of HEPAP, the DOE office of high energy physics advisory panel, along with several HEPAP subpanels.

Laboratory Review Panels: I am currently a member of review committees for the Max Planck Institute in Munich and the DESY laboratory in Hamburg, Germany. In the past, I have served on review committees at Argonne National Laboratory, Lawrence Berkeley National Laboratory, SLAC National Laboratory and Fermilab.

Mentoring: Many of my research papers are co-authored with young BNL post-doctoral fellows who after leaving BNL have gone on to successful research careers. I work with Stony Brook graduate students, and have mentored 2 SCGSR graduate student fellows. From 2012-2018 I was the chair of the scientific advisory board for the Theoretical Advanced Study Institute, which is the premier summer school for advanced graduate students in elementary particle physics. I regularly give extended series of lectures at summer schools for both theoretical and experimental graduate students.

American Physical Society Activities: I have served in the chair line ***(***Chair/Vice Chair/Past Chair) of the Division of Particles and Fields of the American Physical Society, as a member of the APS committee on the Status of Women in Physics , as a member of the APS divisional council, and as a member of the APS nominating committee.

Significant Publications

S. Dawson, C. Englert, and T. Plehn, ***Higgs Physics***, review article to be published in Physics Reports. This article reviews the discovery of the Higgs boson, along with the current theoretical and experimental understanding.

S. Dawson, C..-Y. Chen, and I. Lewis, ***Exploring resonant di-Higgs Boson Production in the Higgs Singlet Model***, Phys. Rev. D91 (2015) 035015. This paper studies the question of whether there is more than one Higgs boson and examines the consequences of a 2nd Higgs boson on the production of a pair of the observed Higgs bosons.

S. Dawson et al, ***Higgs Working Group Report of the Snowmass 2013 Community Planning Study***, arXiv:1310.8361. This is the report of a large working group that I chaired, and examines the future of Higgs physics and the possibilities for future discoveries.

S. Dawson and E. Furlan, ***A Higgs Conundrum with Vector Fermions***, Phys. Rev. D86 (2012) 015021. Following the Higgs discovery in 2012, one of the important areas of research is to determine whether the observed particle has all of the expected properties. This paper studies the possibility that the Higgs boson interacts with hypothetical new spin ½ particles.

S. Dawson and M.-C. Chen, ***One Loop Radiative Corrections to the rho Parameter in the Littlest Higgs Model***, Phys. Rev. D70 (2004) 015003. This paper considers the limitations that precision measurements from the LEP collider at CERN place on possible models of new physics.

S. Dawson, L. Orr, L. Reina, and D. Wackeroth, ***Next to Leading Order Results for tth Production at the Tevatron***, Phys. Rev. Lett. 87 (2001) 201804. One of the important ways to study the Higgs boson at the LHC is the production in association with a top quark. This paper contains precision predictions that were essential for the observation of a top quark with a Higgs boson in 2018.

S. Dawson, S. Dittmaier, and M. Spira, ***Neutral Higgs Boson Pair Production at Hadron Colliders***, Phys. Rev. D58 (1998) 115012. Following the discovery of the Higgs boson in 2012, the next anticipated major discovery in the field will be the observation of the simultaneous production of 2 Higgs boson. This paper contains the first precision calculation for double Higgs production.

S. Dawson, ***Radiative Corrections to Higgs Boson Production***, Nucl. Phys. B359 (1991) 283. This article presents the first calculation of next-to-leading order QCD corrections to Higgs boson production, and was the beginning of a program of precision calculations of Higgs properties. These calculations were an essential ingredient of the Higgs discovery.

J. Gunion, H. Haber, G. Kane, and S. Dawson, ***The Higgs Hunters Guide***, Addison-Wesley (Menlo Park) 1990. This book, written before the Higgs discovery, is a widely used reference for graduate and post-doctoral researchers who are studying the properties of the Higgs boson.

S. Dawson, ***The Effective W Approximation***, Nucl. Phys. B249 (1985) 42. This article was the first observation that at high energies, the interactions of the electroweak W and Z gauge bosons can be treated as if they were fundamental constituents of the proton. This led to the prediction of the weak boson fusion channel, one of major mechanisms for producing a Higgs boson at the LHC.