JAY HAUSER

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EDUCATION AND TRAINING:

University of Michigan, Ann Arbor, MI California Institute of Technology, Pasadena, CA University of Chicago, Chicago, IL B.S. in Physics, 1978 Ph.D. in Physics, 1985 Enrico Fermi Fellowship, postdoc, 1985-89

RESEARCH AND PROFESSIONAL EXPERIENCE:

University of California, Los Angeles (UCLA) Fermilab Distinguished Professor of Physics, 7/2019 - present Professor of Physics, 7/1998 – 6/2019 Associate Professor of Physics, 7/1994-6/1998 Assistant Professor of Physics, 7/1990-6/1994 Robert R. Wilson Fellowship, 1989-1990

AWARDS AND HONORS:

Elected Fellow of the American Physical Society, 2014 SSC Junior Faculty Fellow, Texas National Research Laboratory, 1992-93 National Science Foundation Graduate Fellowship, 1979-82

BIOGRAPHICAL SKETCH:

I have been mostly looking for physics beyond the "Standard Model" my whole research career, along the way, somewhat ironically contributing to the discoveries of the heaviest particles of the Standard Model: the top quark in 1994 and the Higgs boson in 2012.

As a graduate student I worked on the Mark III experiment at SLAC and analyzed decays of D mesons using $\psi(3770)$ data, under the guidance of David Hitlin. I then worked with Henry Frisch, Mel Shochet, and Myron Campbell as a Fermi Fellow and postdoc at U. of Chicago, building the electronics for the Level 2 trigger of the CDF (Collider Detector at Fermilab) experiment. Then, as a Wilson Fellow at Fermilab, I worked on the physics justification and the design of a replacement endcap calorimeter for CDF.

I founded the CDF group at UCLA with Thomas Muller in 1990, built a shower maximum detector for a new endcap calorimeter, and searched for Supersymmetry in multi-jet modes (UCLA thesis of F. Keyvan) and multi-lepton modes. I made the first W asymmetry measurement at a hadron collider, and led the first Exotica data analysis group in CDF. Later, I conducted a multi-lepton search for R parity-violating SUSY (UCLA thesis of A. Attal) and used a matrix element likelihood method to make a precise top mass measurement (UCLA thesis of B. Mohr).

I joined the CMS (Compact Muon Solenoid) experiment in 1994, designed, prototyped, and tested the Level 1 muon trigger using Cathode Strip Chambers (CSC) during the late 1990's, built 1500 large circuit boards of several types in the early 2000's and led the commissioning the CSC system in preparation for first LHC beams, especially the trigger and the time synchronization.

I was Project Manager for the CSC muon detector system of CMS during LHC Run 1 (2010-2012), a substantial improvement project between LHC runs, and the start of LHC Run 2 (2015+), leading some 150 physicists and engineers. I was also involved in searches for heavy stable charged particles (2011-2013). I then led planning for the "Phase 2" upgrades for the CMS muon detector.

I then became the System Manager for a newly unified CMS muon system with 65 institutions from 23 countries, and four detector technologies, creating organizational structures and practices, and championing the "Phase 2" upgrades of the muon system (2015-2017), leading to the Phase 2 Muon Technical Design Report. I served as Chair of the CMS muon Institution Board (2018-2020), working to ensure smooth functioning of the large muon group.

I have worked on three published CMS data analyses, the first of which greatly improved timing resolution of the CSC muon detector and applied it to a search for "slow" heavy stable charged particles in LHC Run 1 data (thesis of Chris Farrell). The second analysis searched for spectacular signals from short-lived black holes or sphaleron transitions in LHC Run 2 data; the analysis required a new event generator for sphaleron-like transitions due to a lack of existing tools (thesis of C. Bravo). The third analysis is a search for dimuons displaced from the primary proton-

proton collision vertex that come from decay of a hypothetical long-lived particle. This was the combined work of UCLA and Vienna groups, and the UCLA PhD thesis of W. Nash.

Among other activities, I have been an internal reviewer for 16 CMS data analyses – nine as Chair plus seven as a committee member, yielding three PRL, two PLB, seven JHEP, one PRD and one JINST article. I have prepared numerous institutional reviews of CMS papers on behalf of UCLA. I have been a frequent reviewer of DOE and NSF proposals, and a referee for JHEP. I was the academic vice-chair of the UCLA physics and astronomy department from 2019-2022. In that role, we achieved reform of the undergraduate physics curriculum for the first time in over 30 years, I a member of the team that created the Master's degree in Quantum Science and Technology, and I worked with instructors to make remote instruction due to the COVID-19 pandemic, including laboratory classes, a relative success.

TEN SELECTED PUBLICATIONS IN HIGH ENERGY PHYSICS:

N.B.: Unless noted, all publications list authors in alphabetical order, by surname and/or institution.

- 1) CMS Collaboration, "Search for long-lived particles decaying to a pair of muons in proton-proton collisions at $\sqrt{s} = 13$ TeV," JHEP **05** (2023) 228. DOI: <u>https://doi.org/10.48550/arXiv.2205.08582</u>
- 2) CMS Collaboration, "Search for black holes and sphalerons in high-multiplicity final states in proton-proton collisions at $\sqrt{s} = 13$ TeV," JHEP **11** (2018) 42. DOI: <u>10.1007/JHEP11(2018)042</u>
- C. Bravo, J. Hauser, "BaryoGEN, a Monte Carlo Generator for Sphaleron-Induced Transitions in Proton-Proton Collisions," JHEP 11 (2018) 41. DOI: <u>10.1007/JHEP11(2018)041</u>
- 4) CMS Collaboration, "Search for heavy long-lived charged particles in pp collisions at sqrt(s)=7 and 8 TeV," JHEP 1307, (2013) 122. DOI: <u>10.1007/JHEP07(2013)122</u>
- 5) CMS Collaboration, "Observation of a new boson at a mass of 125 GeV with the CMS experiment at the LHC," Phys. Lett. B 716 (2012) 30. DOI: <u>10.1016/j.physletb.2012.08.021</u>
- 6) CDF Collaboration, "Precise measurement of the top-quark mass in the lepton+jets topology at CDF II", Phys. Rev. Lett. 99, 182002 (2007). DOI: <u>10.1103/PhysRevLett.99.182002</u>
- CDF Collaboration, "Search for Anomalous Production of Multilepton Events in p-pbar Collisions at sqrt(s)=1.96 TeV," Phys. Rev. Lett. 98, 131804 (2007). DOI: <u>10.1103/PhysRevLett.98.131804</u>
- CDF Collaboration, "Search for Gluinos and Squarks at the Fermilab Tevatron Collider," Phys. Rev. D56, 1357 (1997). DOI: <u>10.1103/PhysRevD.56.R1357</u>
- CDF Collaboration, "Observation of Top Quark Production in pbar-p Collisions with the Collider Detector at Fermilab," Phys. Rev. Lett. 74, 2626 (1995). DOI: <u>10.1103/PhysRevLett.74.2626</u>
- CDF Collaboration, "Lepton Asymmetry in W-boson Decays from pbar-p Collisions at sqrt(s)=1.8 TeV," Phys. Rev. Lett. 68, 1458 (1992). DOI: <u>10.1103/PhysRevLett.68.1458</u>

SYNERGISTIC ACTIVITIES:

- 1) Various presentations about particle physics, the LHC, and CMS, such as to the UCLA Bhaumik Institute, Guenakhfest (U. Florida), Korean-American Scientists and Engineers Association (KSEA), the CMS Induction School at CERN.
- 2) Represented CMS as member of the official CERN team to the 2015 AAAS Annual Meeting.
- 3) Created and ran the local Quarknet outreach program at UCLA 2004-06.
- 4) Member of the Fermilab Users' Executive Committee (UEC) 1995-97.