Ehab Hassan

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Contact Information

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Education

08/2009 - 12/2015	Doctor of Philosophy in Physics from the University of Texas at Austin, Austin, Texas, US
06-2004 - 12/2007	Master of Science in Physics from Ain Shams University, Cairo, EG
09/2995 – 06/1999	Bachelor of Science in Physics with Honor from Ain Shams University, Cairo, EG

Employment

06/01/2021 – Present	Research Associate at Oak Ridge National Laboratory, Oak Ridge, TN
09/14/2020 – 05/31/2021	Postdoctoral Research Associate at Oak Ridge National Laboratory, Oak Ridge, TN
09/25/2018 – 09/13/2020	Research Scholar at Institute for Fusion Studies, Austin, TX
09/22/2016 – 09/24/2018	Assistant Professor at Department of Physics, Ain Shams University, Cairo, EG
09/01/2016 – 05/31/2018	Adjunct Faculty at Department of Physics, American University in Cairo, Cairo, EG
01/19/2016 – 05/31/2016	Postdoctoral Fellow at Institute for Computational Engineering and Sciences, Austin, TX
09/01/2010 – 01/18/2016	Assistant Instructor at Department of Physics, University of Texas at Austin, Austin, TX
07/01/2003 – 06/30/2007	IT Training Manager and Web Developer at mogasystems.com, Cairo, EG
12/01/2000 – 08/13/2009	Teaching Assistant at Department of Physics, Ain Shams University, Cairo, EG

Scientific Societies

2022 – Present	American Nuclear Society (ANS)
2013 – Present	American Physical Society (APS)
2012 – Present	American Geophysical Union (AGU)

Honor Societies

The Honor Society of PHI Kappa PHI (ΦΚΦ)

The Physics Honor Society SIGMA PI SIGMA (ΣΠΣ)

Journal Editorial

Nuclear Fusion (NF) at the Institute of Physics (IOP)

Journal of Nuclear Materials and Energy (JNME) at ELSEVIER

Physics of Plasmas (PoP) at the American Institute of Physics (AIP)

Journal of Geophysical Research (JGR) at the American Geophysical Union (AGU)

Fellowships, Scholarships, Recognitions, and Awards

09/2022	American Physical Society Career Mentoring Fellow
06/2022	Lightening Talk Finalist at Oak Ridge National Laboratory
07/2015	Vela Fellowship from Los Alamos National Laboratory
08/2008	Doctorate Scholarship from the Egyptian Government

Conference and Workshop Poster Presentations

Hassan E, Park JM, Kessel C, Green D. Re-Examination of the Fusion Nuclear Science Facility (FNSF) Core Plasma Configuration. In APS Division of Plasma Physics Meeting Abstracts 2021 (Vol. 2021, pp. UP11-091).

Halfmoon M, Hatch D, Kotschenreuther M, Mahajan S, Nelson AO, Kolemen E, Laggner FM, Diallo A, Hassan E, Curie M, Groebner R. Analysis of gyrokinetic microinstabilities driving anomalous losses in DIII-D pedestal region. In APS Division of Plasma Physics Meeting Abstracts 2021 (Vol. 2021, pp. NP11-018).

Halfmoon M, Hatch D, Kotschenreuther M, Mahajan S, Nelson A, Kolemen E, Laggner F, Diallo A, Hassan E, Curie M, Groebner R. Microtearing instabilities driving anomalous heat loss in the pedestal region of DIII-D discharges. In APS Division of Plasma Physics Meeting Abstracts 2020 (Vol. 2020, pp. VP11-016).

Curie M, Larakers J, Halfmoon M, Hatch D, Hassan E, Kotschenreuthe M, Hazeltine R, Mahajan S, Chen J, Brower D, Groebner R. Reduced predictive models for Micro-tearing modes in the pedestal. In APS Division of Plasma Physics Meeting Abstracts 2020 (Vol. 2020, pp. ZP08-018).

Hassan E, Guttenfelder W, Hatch D, Hu Y, Chen Y, Parker S, Cgyro@ Pppl Collaboration, Gem@ Cu Collaboration. ETG Benchmarking for GENE/CGYRO/GEM Gyrokinetic Codes in the Pedestal Region. In APS Division of Plasma Physics Meeting Abstracts 2019 (Vol. 2019, pp. GP10-060).

Hatch D, Kotschenreuther M, Mahajan S, Halfmoon M, Hassan E, Merlo G, Michoski C, Canik J, Joseph I, Umansky M, Guttenfelder W. Understanding pedestal transport via combined gyrokinetic and edge modeling. In APS Division of Plasma Physics Meeting Abstracts 2019 (Vol. 2019, pp. GP10-059).

Halfmoon M, Hatch D, Kotschenreuther M, Mahajan S, Hassan E, Nelson O, Laggner F, Diallo A, Groebner R. Application of gyrokinetic "fingerprints' 'in identifying microinstabilities in DIII-D pedestals. In APS Division of Plasma Physics Meeting Abstracts 2019 (Vol. 2019, pp. PP10-124).

Hassan E, Morley S. Predicting the Uncertainty in the Near-Earth Solar Wind, GEM Workshop 2019, Santa Fe, NM (https://gem.epss.ucla.edu/mediawiki/index.php/2019_GEM-CEDAR_Joint_Workshop_and_GEM_Workshop).

Hassan E, Morley S, Steinberg JT. Generation of a Solar Wind Ensemble for Space Weather Forecasting. In AGU Fall Meeting Abstracts 2015 Dec (Vol. 2015, pp. SM41A-2463).

Horton Jr W, Hassan E, Litt SK, Smolyakov AI, Rainwater D. Multiscale equatorial electrojet turbulence for GNSS disruption physics. In AGU Fall Meeting Abstracts 2015 Dec (Vol. 2015, pp. SA42A-06).

Horton Jr W, Hassan E, Smolyakov A, Litt S, Hatch DR. Unified Model of Type I and Type II Turbulence in the Equitorial E-Layer Plasma. In AGU Fall Meeting Abstracts 2014 Dec (Vol. 2014, pp. SA11C-3950).

Hassan E, Horton W, Smolyakov A, Litt S, Hatch D. Nonlocal unified type-I and type-II model of the low-latitude E-region irregularities at solar minimum and solar maximum. In AGU Fall Meeting Abstracts 2013 Dec (Vol. 2013, pp. SA13A-1937).

"Another Fluid Simulation Results for Low-Latitude Irregularities in E-region", CEDAR Annual Meeting 2013, Boulder, CO (https://cedarscience.org/2013-workshop).

Wendell Jr W, Hassan, E, Litt S, Smolyakov A. "Transitions in Ionospheric Turbulence from Farley-Buneman to Drift Gradient Regimes", CEDAR Annual Meeting 2012, Santa Fe, NM (https://cedarscience.org/2012-workshop).

Hassan E, Horton Jr W. A Unified Fluid Model for Low-latitude Ionosphere Turbulence Causes Radiowave Scintillations. In AGU Fall Meeting Abstracts 2012 Dec (Vol. 2012, pp. SA51B-2173).

Hassan E, Horton Jr W. Drift Turbulence from Density Gradients in the Ionosphere E-Layer, CEDAR Annual Meeting 2011, Santa Fe, NM (https://cedarscience.org/2011-workshop).

Conference and Workshop Oral Presentations

"Imaging the Internal Structures and Future Threats of the Sand Dunes along the Northwestern Coast of Nile Delta Using SAR," Ramadan R, Hassan E, El-Aasser MA, Yahia A, Gaber A, ICRSSSA 2022.

Hassan E, Kessel C, Snyder P, Park JM, Barnett R, Green D. Core-Edge Plasma Response to Variations in Advanced Tokamak Aspect Ratio using IPS-FASTRAN Plasma Simulator. Bulletin of the American Physical Society. 2022 Oct 19.

Curie M, DIII-D JE. Reduced predictive models for Micro-tearing modes in the pedestal. In APS Division of Plasma Physics Meeting Abstracts 2021 (Vol. 2021, pp. UI01-002).

Hassan E, Hatch D, Merlo G. CheasePy: A Wrapper for CHEASE Code to Reconstruct the MHD Equilibrium of Modified Plasma Profiles and Geometry. In APS Division of Plasma Physics Meeting Abstracts 2020 (Vol. 2020, pp. JM10-006).

Hassan E, Hatch D, Merlo G, Halfmoon M, Kotschenreuther M, Groebner R, Diallo A. Identifying the Micro-Tearing Modes in the DIII-D Pedestal (DEI). In APS Division of Plasma Physics Meeting Abstracts 2020 (Vol. 2020, pp. PO08-011).

Hassan E, Hatch DR, Halfmoon M, Merlo G, Nelson AO, Kotschenreuther M, Mahajan S, Groebner RJ, Diallo A. Clear signature of micro-tearing modes in the DIII-D pedestal, AAPPS-DPP 2020, South Korea.

Morley S, Steinberg JT, Haiducek JD, Welling DT, Hassan E, Weaver BP. Perturbed-input-data ensemble modeling of magnetospheric dynamics. In AGU Fall Meeting Abstracts 2017 Dec (Vol. 2017, pp. SM14A-06).

Hassan E, Hatch DR, Horton W. Plasma Turbulence and Energy Cascades in the Equatorial Electrojet: A Complete Picture in a 2-D Fluid Model. In 2017 AGU Fall Meeting 2017 Dec 11. AGU.

Hassan E, Horton W, Hatch DR, Agullo O, Muraglia M, Benkadda S, Institute for Fusion Studies Collaboration. Asymmetric coupled interchange-ballooning dynamics during magnetic reconnection in the solar wind driven magnetosphere. In APS Division of Plasma Physics Meeting Abstracts 2015 Nov (Vol. 2015, pp. BO7-008).

Hassan E, Hatch D R, Horton Jr W, Litt S, Smolyakov A. "Modeling the Equatorial Electrojet Instabilities driven by Electrojet Current and Density Gradient," CEDAR Annual Meeting 2014, Seattle, WA (https://cedarscience.org/2014-workshop).

Hassan E, Horton W, Smolyakov A, Hatch D. Equatorial Electrojet Instabilities-New Fluid Model Approach. In APS Division of Plasma Physics Meeting Abstracts 2014 Oct (Vol. 2014, pp. NO5-012).

Hassan E, Horton W, Litt SK, Smolyakov A, Benkadda S, USA Collaboration. Transitions in ionospheric turbulence from farley-buneman to drift gradient regimes. In APS Division of Plasma Physics Meeting Abstracts 2011 Oct (Vol. 53, pp. UP9-086).

Journal Articles

"Core-Pedestal Plasma Configurations in Advanced Tokamaks," Ehab Hassan *et al.*, in press, Fusion Science and Technology (FST) 2022.

Curie MT, Hatch DR, Halfmoon M, Chen J, Brower DL, Hassan E, Kotschenreuther M, Mahajan SM, Groebner RJ. Gyrokinetic simulations compared with magnetic fluctuations diagnosed with a Faraday-effect radial interferometer-polarimeter in the DIII-D pedestal. Nuclear Fusion. 2022 Nov 10;62(12):126061.

Halfmoon MR, Hatch DR, Kotschenreuther MT, Mahajan SM, Nelson AO, Kolemen E, Curie M, Diallo A, Groebner RJ, Hassan E, Belli EA. Gyrokinetic analysis of inter-edge localized mode transport mechanisms in a DIII-D pedestal. Physics of Plasmas. 2022 Nov 8;29(11):112505.

Hatch DR, Michoski C, Kuang D, Chapman-Oplopoiou B, Curie M, Halfmoon M, Hassan E, Kotschenreuther M, Mahajan SM, Merlo G, Pueschel MJ. Reduced models for ETG transport in the tokamak pedestal. Physics of Plasmas. 2022 Jun 2;29(6):062501.

Fenstermacher ME, Abbate J, Abe S, Abrams T, Adams M, Adamson B, Aiba N, Akiyama T, Aleynikov P, Allen E, Allen S. DIII-D research advancing the physics basis for optimizing the tokamak approach to fusion energy. Nuclear Fusion. 2022 Apr 21;62(4):042024.

Curie MT, Larakers JL, Hatch DR, Nelson AO, Diallo A, Hassan E, Guttenfelder W, Halfmoon M, Kotschenreuther M, Hazeltine RD, Mahajan SM. A survey of pedestal magnetic fluctuations using gyrokinetics and a global reduced model for microtearing stability. Physics of Plasmas. 2022 Apr 12;29(4):042503.

Hassan E, Hatch DR, Halfmoon MR, Curie M, Kotchenreuther MT, Mahajan SM, Merlo G, Groebner RJ, Nelson AO, Diallo A. Identifying the microtearing modes in the pedestal of DIII-D H-modes using gyrokinetic simulations. Nuclear Fusion. 2021 Dec 17;62(2):026008.

Hassan E, Hatch DR, Guttenfelder W, Chen Y, Parker S. Gyrokinetic benchmark of the electron temperature-gradient instability in the pedestal region. Physics of Plasmas. 2021 Jun 18;28(6):062505.

Hassan E, Keramidas Charidakos I, Morrison PJ, Hatch DR, Horton W. Plasma turbulence in the equatorial electrojet: A two-dimensional Hamiltonian fluid model. Physics of Plasmas. 2017 Jul 27;24(7):072301.

Hassan E, Hatch DR, Morrison PJ, Horton W. Multiscale equatorial electrojet turbulence: Energy conservation, coupling, and cascades in a baseline 2-D fluid model. Journal of Geophysical Research: Space Physics. 2016 Sep;121(9):9127-45.

Litt SK, Smolyakov AI, Hassan E, Horton W. Ion thermal and dispersion effects in Farley-Buneman instabilities. Physics of Plasmas. 2015 Aug 12;22(8):082112.

Hassan E, Horton W, Smolyakov AI, Hatch DR, Litt SK. Multiscale equatorial electrojet turbulence: Baseline 2-D model. Journal of Geophysical Research: Space Physics. 2015 Feb;120(2):1460-77.

Technical Reports

Hatch DR, Kotschenreuther MT, Mahajan SM, Halfmoon M, Hassan E, Merlo G, Michoski C, Canik J, Sontag A, Joseph I, Umansky M. Final report for the FY19 FES theory performance target. USDOE Office of Science (SC), USA. 2019.

Cowee M, Chen Y, Desai R, Hassan E, Kalmoni N, Lin D, Depascuale S, Hughes RS, Zhou H. 2015 Los Alamos Space Weather Summer School Research Reports. Los Alamos National Lab.(LANL), Los Alamos, NM (United States); 2015 Nov 24. “A Statistical Ensemble for Solar Wind Measurements - A Step toward Forecasting,” Ehab Hassan et al., ISR-1 SWSS Report 2015

Grants and Funds

Award Number	Principle Investigator	Award Title
DE-FG02-04ER54742	Waelbroeck, Francois	Establishment of an Institute for Fusion Studies
AGS-0810937	Horton, Wendell Garner, Trevor	US-Egypt Cooperative Research: Monitoring the Ionospheric Weather Over Egypt Using a Chain of Coherent Ionosphere Doppler Receivers
AGS-0964692	Horton, Wendell Van Dam, James	Physics Modeling of Solar Wind Driven Storms and Substorms in the Earth's Magnetosphere-Ionosphere System
DE-SC0018148	Moser, Robert Hatch, David	Partnership Center for High-Fidelity Boundary Plasma Simulation
DE-SC0018429	Hatch, David	Partnership for Multiscale Gyrokinetic (MGK) Turbulence
DE-SC0017992	Candy, Jeff Green, David	AToM: Advanced Tokamak Modeling Environment
DE-SC0001234	ORNL	Basic Energy Sciences

Scientific Training

07/25/2022 – 07/29/2022 ITER Plasma Scenarios and Control International School, UC San Diego, CA
06/01/2015 – 07/24/2015 Space Weather Summer School at Los Alamos National Laboratory, NM
07/21/2014 – 07/26/2014 Incoherent Scattering Radar Summer School at Arecibo Observatory, PR
07/22/2013 – 08/02/2013 Space Weather Summer School at NCAR High Altitude Observatory, CO
07/01/2007 – 07/06/2007 ATMEL Microcontroller Programming, HTC Center, Cairo University, Cairo, EG
08/16/2005 – 08/30/2005 MATLAB Simulink, HTC Center, Cairo University, Cairo, EG
08/01/2005 – 08/15/2005 MATLAB Programming and Visualization, HTC Center, Cairo University, Cairo, EG
09/09/2001 – 04/09/2002 IBM-MCIT Web Development and E-Business Full-Stack, Cairo, Egypt
08/15/1997 – 10/14/2997 and Windows NT Server 4.0 Administration, Syndicate of Applicants, Cairo, EG
06/15/1997 – 08/14/1997 Computer Networking Essentials, Syndicate of Applicants, Cairo, EG

Code Developing Tools

HPC Platforms	NERSC and TACC
HPC Techniques	OpenMP and MPI
GPU Programming	CUDA Toolkit and GPUOpen
Data Science Tools	Pandas, Tensor Flow, and PyTorch
Web Developing Tools	HTML5, CCS3, JavaScript, ASP, and Flask
Programming languages	Julia, C/C++, Python, MATLAB, and Fortran

Certificates and Licenses

05/2016 Emerging Trends and Technologies in the Virtual Classroom (ID: KS32HAGWP63X)
04/2016 Advanced Instructional Strategies in the Virtual Classroom (ID: SVHAXKG7RM5J)
04/2016 Performance Assessment in the Virtual Classroom (ID: 8NB7AC5KKMMA)
04/2016 Foundation of Virtual Instructions (ID: YRNDYA56UG9J)
07/2008 International Computer Driving License (ICDL)
04/2002 Web Development Application Development Certification (CIW ID0-430)
02/2002 Web Development Foundation Certification (CIW ID0-410)

Instructed Workshops

07/2018 Advanced Scientific Computing using Python at Ain Shams University, EG
07/2017 Introduction to Programming using Python at Ain Shams University, EG
07/2009 Advanced Scientific Computing using MATLAB at Ain Shams University, EG
12/2008 Introduction to Programming using MATLAB at Ain Shams University, EG
08/2007 Introduction to Programming using C/C++ at Ain Shams University, EG
09/2006 Introduction to Network Administration using Windows NT at Ain Shams University, EG
06/2005 Introduction to Computer Network Installation at Ain Shams University, EG

01/2004	Introduction to Web Design using HTML+CSS in Minister of Education, EG
03/2003	Intermediate Web Development using JavaScript in Minister of Education, EG
05/2002	Introduction to Web Design using HTML in Minister of Education, EG
03/2001	Introduction to Computers in the Syndicate of Commerce, EG

Instructed Undergraduate/Graduate Courses

2016-2018	**Classroom**	Computational Physics, Programming Languages, Introduction to Computers, Microelectronics, Computational Electromagnetics (Graduate Course), and Radio-Frequency Electronics (Graduate Course).
	Laboratory	Computational Physics using Python, Digital Electronics, and Microwaves
	Physics, Ain Shams University	**Assistant Professor**
2016-2018	**Classroom**	Classical Mechanics, Thermodynamics, and Introduction to Electronics
	Laboratory	Electronic Circuit Design
	Physics, American University in Cairo	**Adjunct Faculty**
2010-2015	**Hybrid**	Classical Mechanics, Thermodynamics, Electricity, Magnetism, and Optics
	Physics, University of Texas at Austin	**Assistant Instructor**
2001-2009	**Laboratory**	Optics, Electricity, Magnetism, DC/AC Circuits, Digital Electronics, Microwave, Thermodynamics, Microcontrollers, Computer Networks, and Antennas.
	Physics, Ain Shams University	**Teaching Assistant**

Volunteering Activities

02/2023	Tennessee Science Bowl (TSB), Knoxville, TN	Science Judge
12/2022 – Present	Hour of Code in Knox County Schools, Knoxville, TN	Teacher Assistant
10/2021 – Present	Habitat for Humanity of Knoxville, Knoxville, TN	Construction Crew Leader
06/2017 – 06/2018	K-12 Science Fair by Science Crafts Inc., Cairo, EG	Science Judge
10/2012 – 04/2016	YMCA Lake Travis at Austin, TX	Youth Coach
09/2003 – 07/2009	Environment Protection Group @ ASU, Cairo, EG	Youth Group Lead