R Alex Tinguely

Curriculum Vitae

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Current

Feb 2022 **Research Scientist**, *Plasma Science and Fusion Center, Massachusetts Institute of Technology*. **Group Leader, Energetic Particle Physics, Magnetic Fusion Energy.** Energetic particle physics in the SPARC, ARC, and other tokamaks/stellarators: interactions of fast ions and alpha particles with Alfvén Eigenmodes and MHD; disruptions, generation and mitigation of runaway electrons; diagnosis of fusion neutrons, ions, hard x-rays, and gammas; diagnostic design and prototyping for fusion devices.

Record Google Scholar profile, h-index: 24

Education

Jun 2019 **PhD in Physics**, *Department of Physics, Plasma Science and Fusion Center*, Massachusetts Institute of Technology, Cambridge, MA, USA, *GPA: 5.0/5.0*.

May 2014 **BS in Physics and Mathematics**, *summa cum laude and with Honors*, Iowa State University, Ames, IA, USA, *GPA: 3.99/4.0*.

May 2010 **High School Diploma**, *Valedictorian*, Holy Trinity Catholic High School, Fort Madison, IA, USA.

Postdoctoral Research, Jul 2019 - Jan 2022

Employer Plasma Science and Fusion Center, Massachusetts Institute of Technology

Superivisor Prof. Miklos Porkolab

Description Operation, maintenance, and data analysis of the Alfvén Eigenmode Active Diagnostic. Sponsored by EUROfusion and located at the JET tokamak, Culham Centre for Fusion Energy, Abingdon, UK.

PhD Thesis, Aug 2014 - Jun 2019

Title *An analysis of synchrotron radiation from relativistic electrons in the Alcator C-Mod tokamak*

Advisors Dr. Robert Granetz, Dr. Earl Marmar

Committee Prof. Miklos Porkolab, Prof. John Belcher

Description My thesis work focused on the diagnosis of relativistic "runaway" electrons in tokamak plasmas. Specifically, I studied their generation and phase-space dynamics through measurements of spectra, images, and polarization of their synchrotron emission.

Publications

1. ***RA Tinguely**, J Gonzalez-Martin, and Y Todo.* Hybrid kinetic-MHD modeling of alpha-driven TAEs in the SPARC tokamak. *Nuclear Fusion* **65** 036021 (2025): doi:10.1088/1741-4326/adaf40

2. ***RA Tinguely**, AM Rosenthal, M Silva Sa, M Jean, and I Abramovic.* Synthetic measurements of runaway electron synchrotron emission in the SPARC tokamak. *Review of Scientific Instruments* **95** 113503 (2024): doi:10.1063/5.0219477, arXiv:2409.13670

3. ***RA Tinguely**, PG Puglia, S Dowson, M Porkolab, D Douai, A Fasoli, L Frassinetti, D King, P Schneider, and JET Contributors.* Isotope effects and Alfvén eigenmode stability in JET H, D, T, DT, and He plasmas. *Nuclear Fusion* **64** 096002 (2024): doi:10.1088/1741-4326/ad6013, arXiv:2405.17752

4. ***RA Tinguely**, I Pusztai, VA Izzo, K Särkimäki, T Fülöp, DT Garnier, RS Granetz, M Hoppe, C Paz-Soldan, A Sundström, and R Sweeney.* On the minimum transport required to passively suppress runaway electrons in SPARC. *Plasma Physics and Controlled Fusion* **65** 034002 (2023): doi:10.1088/1361-6587/acb083, arXiv:2301.01435

5. ***RA Tinguely**, J Gonzalez-Martin, PG Puglia, N Fil, S Dowson, M Porkolab, I Kumar, M Podestà, M Baruzzo, A Fasoli, YeO Kazakov, MFF Nave, M Nocente, J Ongena, Ž Štancar, and JET Contributors.* Simultaneous measurements of unstable and stable Alfvén Eigenmodes in JET. *Nuclear Fusion* **62** 112008 (2022): doi:10.1088/1741-4326/ac899e, arXiv:2208.05052, corrigendum:10.1088/1741-4326/ad9c94

6. ***RA Tinguely**, N Fil, PG Puglia, S Dowson, M Porkolab, V Guillemot, M Podestà, M Baruzzo, R Dumont, A Fasoli, M Fitzgerald, YeO Kazakov, MFF Nave, M Nocente, J Ongena, SE Sharapov, Ž Štancar, and JET Contributors.* A novel measurement of marginal Alfvén Eigenmode stability during high power auxiliary heating in JET. *Nuclear Fusion* **62** 076001 (2022): doi:10.1088/1741-4326/ac3c84, arXiv:2111.13569

7. ***RA Tinguely**, VA Izzo, DT Garnier, A Sundström, K Särkimäki, O Embréus, T Fülöp, RS Granetz, M Hoppe, I Pusztai, and R Sweeney.* Modeling the complete prevention of disruption-generated runaway electron beam formation with a passive 3D coil in SPARC. *Nuclear Fusion* **61** 124003 (2021): doi:10.1088/1741-4326/ac31d7, arXiv:2110.10598

8. ***RA Tinguely**, PG Puglia, N Fil, S Dowson, M Porkolab, A Dvornova, A Fasoli, M Fitzgerald, V Guillemot, GTA Huysmans, M Maslov, S Sharapov, D Testa, and JET Contributors.* Experimental studies of plasma-antenna coupling with the JET Alfven Eigenmode Active Diagnostic. *Nuclear Fusion* **61** 026003 (2021): doi:10.1088/1741-4326/abc7eb, arXiv:2011.02768

9. ***RA Tinguely**, PG Puglia, N Fil, S Dowson, M Porkolab, A Fasoli, D Testa, and JET Contributors.* Results from the Alfvén Eigenmode Active Diagnostic during the 2019-2020 JET deuterium campaign. *Plasma Physics and Controlled Fusion* **62** 115002 (2020): doi:10.1088/1361-6587/aba7f7,

arXiv:2007.09412

10. ***RA Tinguely*** *and AP Turner.* Optical analogues to the equatorial Kerr–Newman black hole. *Nature Communications Physics* **3** 120 (2020): doi:10.1038/s42005-020-0384-5, arXiv:1909.05256

11. ***RA Tinguely***, *KJ Montes, C Rea, R Sweeney, and RS Granetz.* An application of survival analysis to disruption prediction via Random Forests. *Plasma Physics and Controlled Fusion* **61** 095009 (2019): doi:10.1088/1361-6587/ab32fc, arXiv:1907.04291

12. ***RA Tinguely***, *M Hoppe, RS Granetz, RT Mumgaard, and S Scott.* Experimental and synthetic measurements of polarized synchrotron emission from runaway electrons in Alcator C-Mod. *Nuclear Fusion* **59** 096029 (2019): doi:10.1088/1741-4326/ab2d1d, arXiv:1906.11304

13. ***RA Tinguely***, *A Rosenthal, R Simpson, SB Ballinger, AJ Creely, S Frank, AQ Kuang, BL Linehan, W McCarthy, LM Milanese, KJ Montes, T Mouratidis, JF Picard, P Rodriguez-Fernandez, AJ Sandberg, F Sciortino, EA Tolman, M Zhou, BN Sorbom, ZS Hartwig, and AE White.* Neutron diagnostics for the physics of a high-field, compact, Q $\geq$ 1 tokamak. *Fusion Engineering and Design* **143** 212-225 (2019): doi:10.1016/j.fusengdes.2019.03.148, arXiv:1903.09479

14. ***RA Tinguely***, *RS Granetz, M Hoppe, and O Embréus.* Spatiotemporal evolution of runaway electrons from synchrotron images in Alcator C-Mod. *Plasma Physics and Controlled Fusion* **60** 124001 (2018): doi:10.1088/1361-6587/aae6ba, arXiv:1810.02742

15. ***RA Tinguely***, *RS Granetz, M Hoppe, and O Embréus.* Measurements of runaway electron synchrotron spectra at high magnetic fields in Alcator C-Mod. *Nuclear Fusion* **58** 076019 (2018): doi:10.1088/1741-4326/aac444, arXiv:1805.05412

16. ***RA Tinguely***, *RS Granetz, A Berg, AQ Kuang, D Brunner, and B LaBombard.* High-resolution disruption halo current measurements using Langmuir probes in Alcator C-Mod. *Nuclear Fusion* **58** 016005 (2018): doi:10.1088/1741-4326/aa8fa6, arXiv:1810.03207

17. *JC Hillesheim, et al.* Overview of the physics basis for the ARC fusion power plant. *Journal of Plasma Physics* **92** 3 (2026): doi:10.1017/S0022377826101706

18. *R Sweeney, et al.* ARC Disruption Physics and Strategy. Submitted for publication in *Journal of Plasma Physics*. (2025)

19. *S Ratynskaia, et al.* Runaway electron-induced plasma facing component damage in tokamaks. Accepted for publication in *Plasma Physics and Controlled Fusion*. (2025): arXiv:2506.10411

20. *R Datta, et al.* Modeling the effect of MHD activity on runaway electron generation during SPARC disruptions. *Nuclear Fusion* **66** 046013 (2026): doi:10.1088/1741-4326/ae4abb

21. *JL Ball, et al.* Measurements of Fusion Yield on the Centrifugal Mirror Fusion Experiment. *Nuclear Fusion* **66** 016010 (2025): doi:10.1088/1741-4326/ae0faa arXiv:2505.23047

22. *R Datta, et al.* Coupled 2-D MHD and runaway electron fluid simulations of SPARC disruptions. *Physics of Plasmas* **32** 082505 (2025): doi:10.1063/5.0272430, arXiv:2503.18777

23. *X Wang,et al.* An OpenMC Model of the SPARC Tokamak for Diagnostic Scoping Studies. *Fusion Engineering and Design* **221** 115390 (2025): doi:10.1016/j.fusengdes.2025.115390

24. *I Ekmark, et al.* Runaway electron generation in disruptions mitigated by deuterium and noble gas injection in SPARC. *Journal of Plasma Physics* **91** 3 E82 (2025): doi:S0022377825000455, arXiv:2502.19891

25. *VA Izzo, et al.* Disruption mitigation modeling for the SPARC tokamak. *Physics of Plasmas* **32** 042507 (2025): doi:10.1063/5.0254080

26. *JL Ball, et al.* Evaluating deuterated-xylene for use as a fusion neutron spectrometer. *Review of Scientific Instruments* (2024) **95** 123514 (2024): doi:10.1063/5.0219490

27. *M Gatu-Johnson, et al.* Learning from Each Other: Cross-Cutting Diagnostic Development Activities Between Magnetic and Inertial Confinement Fusion. *Review of Scientific Instruments* **95** 093533 (2024): doi:10.1063/5.0218498

28. *S Mackie, et al.* Ion optical design of the magnetic proton recoil neutron spectrometer for burning plasma diagnosis of the SPARC tokamak. *Review of Scientific Instruments* **95** 103502 (2024): doi:10.1063/5.0219551

29. *E Panontin, et al.* Development of the prototype for the SPARC hard X-ray monitor. *Review of Scientific Instruments* **95** 083516 (2024): doi:10.1063/5.0219549

30. *P Raj, et al.* Overview of the Preliminary Design of SPARC's Neutron Diagnostic Systems. *Review of Scientific Instruments* **95** 103507 (2024): doi:10.1063/5.0219538

31. *ML Reinke, et al.* Overview of the Early Campaign Diagnostics for the SPARC Tokamak. *Review of Scientific Instruments* **95** 103518 (2024): doi:10.1063/5.0218254

32. *M Dalla Rosa, et al.* Design solutions for the hodoscope of the magnetic proton recoil neutron spectrometer of the SPARC tokamak. Submitted to *Review of Scientific Instruments* **95** 083508 (2024): doi:10.1063/5.0219463

33. *D Vezinet, et al.* SPARC X-ray diagnostics: technical and functional overview. Submitted to *Review of Scientific Instruments* **95** 093515 (2024): doi:10.1063/5.0219486

34. *X Wang, et al.* Neutronics Simulations for the Design of Neutron Flux Monitors in SPARC. *Review*

of Scientific Instruments **95** 083560 (2024): doi:10.1063/5.0219508

35. *Z Keith, et al.* Risk-Aware Framework Development for Disruption Prediction: Alcator C-Mod and DIII-D Survival Analysis. *Journal of Fusion Energy* **43** 21 (2024): doi:10.1007/s10894-024-00413-y

36. *VA Izzo, et al.* Boundary condition effects on Runaway Electron Mitigation Coil modeling for the SPARC and DIII-D tokamaks. *Nuclear Fusion* **64** 066003 (2024): doi:10.1088/1741-4326/ad3c52

37. *T Sakabe, et al.* Neutron energy distribution and energy-corrected spatial distribution around a sealed-tube DT fusion neutron generator. *IEEE Transactions on Plasma Science* (2024): doi:10.1109/TPS.2024.3384234

38. *AF Battey, et al.* Design of Passive and Structural Conductors for Tokamaks Using Thin-Wall Eddy Current Modeling. *Nuclear Fusion* **64** 016010 (2023): doi:10.1088/1741-4326/ad0bcf

39. *M Fitzgerald, et al.* Stability analysis of toroidal Alfvén eigenmodes observed in JET deuterium-tritium internal transport barrier plasmas. *Nuclear Fusion* **63** 112006 (2023): doi:10.1088/1741-4326/acee14

40. *SE Sharapov, et al.* Experiments on excitation of Alfvén eigenmodes by alpha-particles with bump-on-tail distribution in JET DTE2 plasmas. *Nuclear Fusion* **63** 112007 (2023): doi:10.1088/1741-4326/acee10

41. *HJC Oliver, et al.* Toroidal Alfvén eigenmodes observed in low power JET deuterium-tritium plasmas. *Nuclear Fusion* **63** 112008 (2023): doi:10.1088/1741-4326/acedc3

42. *AR Saperstein, et al.* Disruption halo current rotation scaling on Alcator C-Mod and HBT-EP. *Physics of Plasmas* **30** 042506 (2023): doi:10.1063/5.0140867

43. *JX Zhu, et al.* Integrated deep learning framework for unstable event identification and disruption prediction of tokamak plasmas. *Nuclear Fusion* **63** 046009 (2023): doi:10.1088/1361-6587/acb083

44. *A Braun, et al.* Effects of neoclassical tearing modes and toroidal field ripple on lost alpha power in the SPARC tokamak. *Plasma Physics and Controlled Fusion* **64** 125014 (2022): doi:10.1088/1361-6587/ac9ed8

45. *M Tardocchi, et al.* A high-resolution neutron spectroscopic camera for the SPARC tokamak based on the JET European Torus Deuterium-Tritium experience. *Review of Scientific Instruments* **93** 113512 (2022): doi:10.1063/5.0101779

46. *VA Izzo, et al.* Runaway electron deconfinement in SPARC and DIII-D by a passive 3D coil. *Nuclear Fusion* **62** 096029 (2022): doi:10.1088/1741-4326/ac83d8, arXiv:2207.12450

47. *C Reux, et al.* Physics of runaway electrons with Shattered Pellet Injection at JET. *Plasma Physics and Controlled Fusion* **64** 034002 (2022): doi:10.1088/1361-6587/ac48bc

48. *P Rodriguez-Fernandez, et al.* Overview of the SPARC physics basis towards the exploration of burning-plasma regimes in high-field, compact tokamaks. *Nuclear Fusion* **62** 042003 (2022): doi:10.1088/1741-4326/ac1654

49. *N Fil, et al.* Interpretation of electromagnetic modes in the sub-TAE frequency range in JET plasmas with elevated monotonic q-profiles. *Physics of Plasmas* **28** 102511 (2021): doi:10.1063/5.0057844

50. *JX Zhu, et al.* Scenario adaptive disruption prediction study for next generation burning-plasma tokamaks. *Nuclear Fusion* **61** 114005 (2021): doi:10.1088/1741-4326/ac28ae

51. *KJ Montes, et al.* A Semi-Supervised Detector for Physics Events in Tokamak Discharges. *Nuclear Fusion* **61** 026022 (2021): doi:10.1088/1741-4326/abcdb9

52. *JX Zhu, et al.* A Hybrid Deep Learning architecture for general disruption prediction across tokamaks. *Nuclear Fusion* **61** 026007 (2021): doi:10.1088/1741-4326/abc664

53. *R Sweeney, et al.* MHD Stability and Disruptions in the SPARC Tokamak. *Journal of Plasma Physics* **86** (5) 865860507 (2020): doi:10.1017/S0022377820001129

54. *AJ Creely, et al.* Overview of the SPARC Tokamak. *Journal of Plasma Physics* **86** (5) 865860502 (2020): doi:10.1017/S0022377820001257

55. *AJ Creely, et al.* Design Study of a Combined Interferometer and Polarimeter for a High-Field, Compact Tokamak. *Physics of Plasmas* **27** 042516 (2020): doi:10.1063/1.5142638

56. *KJ Montes, et al.* Machine learning for disruption warning on Alcator C-Mod, DIII-D, and EAST. *Nuclear Fusion* **59** 096015 (2019): doi:10.1088/1741-4326/ab1df4

57. *C Rea, et al.* A real-time machine learning-based disruption predictor on DIII-D. *Nuclear Fusion* **59** 096016 (2019): doi:10.1088/1741-4326/ab28bf

58. *ML Reinke, et al.* Avoidance of impurity-induced Current Quench using Lower Hybrid Current Drive. *Nuclear Fusion* **59** 066003 (2019): doi:10.1088/1741-4326/ab0eb2

59. *AQ Kuang, et al.* Conceptual design study for heat exhaust management in the ARC fusion pilot plant. *Fusion Engineering and Design* **137** 221–242 (2018): doi:10.1016/j.fusengdes.2018.09.007, arXiv:1809.10555

60. *C Rea, et al.* Disruption prediction investigations using Machine Learning tools on DIII-D and Alcator C-Mod. *Plasma Physics and Controlled Fusion* **60** 084004 (2018): doi:10.1088/1361-6587/aac7fe

61. *M Hoppe, et al.* SOFT: A synthetic synchrotron diagnostic for runaway electrons. *Nuclear Fusion* **58** 026032 (2018): doi:10.1088/1741-4326/aa9abb, arXiv:1709.00674

Presentations

Nov 2025 *X Wang, RA Tinguely, et al.* Latest progress in the characterization of neutron flux Monitors for the SPARC tokamak. Contributed poster, 67th Annual Meeting of the APS Division of Plasma Physics, Long Beach, CA, USA.

Jun 2025 *D Lobelo,..., RA Tinguely.* Prototyping the neutron activation foils for fusion energy measurements in SPARC. 2025 Symposium on Fusion Engineering, Boston, MA, USA.

Jun 2025 *RA Tinguely, et al.* An update on runaway electron modeling and mitigation in SPARC. Joint Runaway Electron Modelling (REM) and WPTE RT03 Analysis meeting (2025), Lausanne, Switzerland.

Apr 2025 *RA Tinguely, et al.* Energetic particle transport, modeling, and diagnosis for SPARC. 2025 US Transport Task Force Workshop, Seattle, WA, USA.

Mar 2025 *RA Tinguely, M Muraca, PJ Bonofiglo, J Gonzalez-Martin, L Nichols, A Kumar, P Rodriguez-Fernandez, N Howard, J Wright, A LeViness, S Scott.* Fast ion transport and its impact on plasma performance in SPARC. 18th Technical Meeting on Energetic Particles in Magnetic Confinement Systems, Seville, Spain.

Oct 2024 *RA Tinguely, J Gonzalez-Martin, S Scott, M Muraca, PJ Bonofiglo, L Nichols, E Panontin, W Burke, P Rodriguez-Fernandez, S McKanas, C Myers.* Fast ion driven instabilities, transport, and diagnostic opportunities in SPARC. Contributed poster, 66th Annual Meeting of the APS Division of Plasma Physics, Atlanta, GA, USA.

Oct 2024 *RA Tinguely, AH Seltzman, C Wink, J Hare, J Scarborough, G Wallace, and M Gatu Johnson.* DEIA Initiatives and Organizational Efforts at the PSFC. Contributed talk, 66th Annual Meeting of the APS Division of Plasma Physics, Atlanta, GA, USA.

Jun 2024 *RA Tinguely, J Boguski, C Clauser, A Feyrer, RS Granetz, E Panontin, V Izzo, AF Battey, C Paz Soldan, and R Sweeney.* An update on runaway electron mitigation and diagnosis in SPARC. Contributed talk, Joint Runaway Electron Modelling (REM) and JET SPI Analysis meeting, Lausanne, Switzerland.

Apr 2024 *RA Tinguely, AM Rosenthal, M Silva Sa, I Abramovic, M Jean, and the SPARC team.* Synthetic measurements of runaway electron synchrotron emission in SPARC. Contributed poster, 25th Topical Conference on High Temperature Plasma Diagnostics, Asheville, NC, USA.

Oct 2023 *RA Tinguely, JL Ball, RS Granetz, NT Howard, S Mackie, E Panontin, C Perks, J Rice, P Rodriguez Fernandez, GM Wallace, X Wang, JC Wright, DJ Battaglia, T Body, D Boyer, M Brookman, AJ Creely, ML Garret, R Gocht, I Holmes, C Myers, P Raj, ML Reinke, A Rosenthal, D Vezinet, A Lachmann, N Leuthold, C Paz Soldan, I Stewart.* Measuring fusion gain $Q > 1$ in SPARC. Contributed talk, 65th Annual Meeting of the APS Division of Plasma Physics, Denver, CO, USA.

Oct 2023 *RA Tinguely, S Dowson, PG Puglia, M Porkolab, and JET Contributors.* First results on Alfvén eigenmode stability during the JET DTE3 campaign. Contributed talk, 30th Meeting of the ITPA Topical Group on Energetic Particle Physics, Culham, UK.

Oct 2023 *RA Tinguely, M Porkolab, S Dowson, PG Puglia, J Garcia, A Fasoli, J Gonzalez-Martin, YeO Kazakov, M Podestà, and JET Contributors.* Investigations of Alfvén Eigenmode stability via active antenna excitation in JET Hydrogen, Deuterium, Tritium, DT, and Helium plasmas. Contributed poster and paper, 29th IAEA Fusion Energy Conference, London, UK.

May 2023 *RA Tinguely, P Puglia, S Dowson, M Porkolab, A Fasoli, D Testa, D King, ER Solano, RB Henriques, D Douai, C Perez von Thun, E Delabie, I Jepu, and JET Contributors.* Active MHD spectroscopy with the upgraded JET Alfven Eigenmode Active Diagnostic. 29th Meeting of the ITPA Topical Group on Energetic Particle Physics, Oak Ridge, TN, USA.

Oct 2022 *RA Tinguely, M Porkolab, P Puglia, N Fil, S Dowson, M Fitzgerald, D Keeling, HJC Oliver, SE Sharapov, Ž Štancar, R Dumont, J Garcia, YeO Kazakov, PJ Bonofiglo, M Podestà, A Fasoli, and JET Contributors.* Measurements of Alfvén Eigenmode stability in the 2021 JET DT campaign. Selected talk, session on *Research in Support of ITER*, 64th Annual Meeting of the APS Division of Plasma Physics, Spokane, WA, USA.

Sep 2022 *RA Tinguely.* SPARC: Fast particles & the fastest path to a burning plasma. Invited seminar, Università di Milano-Bicocca, Milan, Italy.

Sep 2022 *RA Tinguely, VA Izzo, I Pusztai, K Särkimäki, DT Garnier, A Sundström, T Fülöp, RS Granetz, M Hoppe, C Paz-Soldan, R Sweeney, and the SPARC team*. Modeling of runaway electron suppression with a passive 3D coil in SPARC. Invited talk, Varenna – Lausanne International Workshop on the Theory of Magnetic Confinement Systems, Varenna, Italy.

June 2022 *RA Tinguely, N Fil, P Puglia, S Dowson, M Porkolab, PJ Bonofiglo, R Dumont, A Fasoli, M Fitzgerald, D Keeling, HJC Oliver, M Podestà, SE Sharapov, AA Teplukhina, and JET Contributors*. Exploration of Alfven Eigenmode physics via active antenna excitation in JET Deuterium, Tritium, and DT plasmas. Contributed poster and paper, 48th EPS Conference on Plasma Physics (virtual).

Feb 2022 *RA Tinguely, A Braun, S Scott, GJ Kramer, M Podestà.* Effects of MHD on fast ion confinement in SPARC. Invited talk, PPPL Energetic Particle Physics Seminar (virtual).

Dec 2021 *RA Tinguely, M Porkolab, P Puglia, N Fil, S Dowson, R Coelho, R Dumont, A Fasoli, M Fitzgerald, V. Guillemot, D Keeling, I Kumar, M Podestà, SE Sharapov, AA Teplukhina, and JET Contributors.* Measurements of Alfvén Eigenmode stability in JET D and T plasmas. Contributed talk, 17th IAEA Technical Meeting on Energetic Particles and Theory of Plasma Instabilities in Magnetic Confinement Fusion (virtual).

Nov 2021 *RA Tinguely, M Porkolab, PG Puglia, A Fasoli, N Fil, S Dowson, M Fitzgerald, D Keeling, SE Sharapov, R Dumont, J Gonzalez Martin, Z Lin, Y Kazakov, J Ongena, M Nocente, M Podestà, AA Teplukhina, Ž Štancar, and JET Contributors.* Alfvén Eigenmode stability measurements in recent JET H, D, T, and DT plasmas. Selected talk, session on *Research in Support of ITER*, 63rd Annual Meeting of the APS Division of Plasma Physics, Pittsburgh, PA, USA (hybrid).

July 2021 *RA Tinguely, VA Izzo, DT Garnier, A Sundström, K Särkimäki, O Embréus, T Fülöp, RS Granetz, M Greenwald, M Hoppe, I Pusztai, and R Sweeney* . Complete prevention of runaway electron beam formation with a passive 3D coil in SPARC. Invited talk, IAEA-PPPL Theory and Simulation of Disruptions Workshop (virtual).

June 2021 *RA Tinguely, P Puglia, N Fil, M Porkolab, S Dowson, D Douai, R Dumont, A Fasoli, M Fitzgerald, SE Sharapov, and JET Contributors*. Exploration of Alfven Eigenmode physics via active antenna excitation in JET deuterium and hydrogen plasmas. Contributed poster and paper, 47th EPS Conference on Plasma Physics (virtual).

May 2021 *RA Tinguely, N Fil, PG Puglia, S Dowson, M Porkolab, V Guillemot, M Podestà, M Baruzzo, A Fasoli, M Fitzgerald, Y Kazakov, MFF Nave, M Nocente, J Ongena, SE Sharapov, Ž Štancar, and JET Contributors*. A novel measurement of marginal Alfven Eigenmode stability during high power auxiliary heating in JET. Contributed talk, 25th Meeting of ITPA Topical Group on Energetic Particle Physics (virtual).

May 2021 *RA Tinguely, M Porkolab, N Fil, P Puglia, V Aslanyan, D Borba, S Dowson, R Dumont, A Fasoli, M Fitzgerald, Z Lin, SE Sharapov, D Testa, and JET Contributors*. Experimental and computational investigations of Alfven Eigenmode stability in JET plasmas through active antenna excitation. Contributed poster and paper, 28th IAEA Fusion Energy Conference (virtual).

Nov 2020 *RA Tinguely, N Fil, P Puglia, M Porkolab, S Dowson, N Dreval, R Dumont, A Fasoli, M Fitzgerald, Y Kazakov, D Keeling, Z Lin, M Nocente, J Ongena, S Sharapov, D Testa, and JET Contributors*. Novel measurements of Alfven Eigenmode stability via active antenna excitation in JET plasmas. Contributed talk, 62nd Annual Meeting of the APS Division of Plasma Physics (virtual).

Oct 2020 *RA Tinguely, N Fil, P Puglia, M Porkolab, S Dowson, N Dreval, R Dumont, A Dvornova, A Fasoli, M Fitzgerald, V Guillemot, GTA Huysmans, Y Kazakov, D Keeling, Z Lin, M Maslov, M Nocente, J Ongena, S Sharapov, Z Stancar, D Testa, and JET Contributors*. An overview of recent AE stability measurements on JET. Contributed talk, 24th Meeting of ITPA Topical Group on Energetic Particle Physics (virtual).

Jan 2020 *RA Tinguely, N Hawkes, E Rachlew, M Hoppe, O Ficker, C Reux, M Lehnen, N Eidietis, S Silburn, and JET Contributors*. Polarized synchrotron emission from post-disruption runaway electrons in the JET C38 campaign. Contributed talk, 8th Meeting on Runaway Electron Modeling, Gothenburg, Sweden.

Oct 2019 *RA Tinguely, KJ Montes, C Rea, R Sweeney, and RS Granetz*. Plasma survival analysis: estimating survival probabilities and expected lifetimes from binary classification and Random Forests. Invited talk, 24th Workshop on MHD Stability Control, New York City, NY, USA.

Oct 2019 *RA Tinguely, O Embréus, T Fülöp, L Hesslow, M Hoppe, P Svensson, O Vallhagen, S Newton, P Helander, AJ Creely, D Garnier, RS Granetz, N Howard, P Rodriguez-Fernandez, R Sweeney, and the SPARC team.* Runaway electrons in SPARC. Contributed talk, 61st Annual Meeting of the APS Division of Plasma Physics, Fort Lauderdale, FL, USA.

May 2019 *RA Tinguely*. An analysis of synchrotron radiation from relativistic electrons in the Alcator C-Mod tokamak. Doctoral Thesis Defense, MIT, Cambridge, MA, USA.

Jan 2019 *RA Tinguely, RS Granetz, RT Mumgaard, M Hoppe, O Embréus, T Fülöp, and S Scott.* Experimental and synthetic measurements of polarized synchrotron emission from runaway electrons in Alcator C-Mod. Contributed talk, 7th Meeting on Runaway Electron Modeling, Gothenburg, Sweden.

Nov 2018 *RA Tinguely, RS Granetz, M Hoppe, O Embréus, T Fülöp, S Scott, and RT Mumgaard.* Synchrotron spectra, images, and polarization measurements from runaway electrons in Alcator C-Mod. Selected talk, session on *Research in Support of ITER*, 60th Annual Meeting of the APS Division of Plasma Physics, Portland, OR, USA.

Jul 2018 *RA Tinguely, RS Granetz, M Hoppe, O Embréus, T Fülöp, and S Scott.* Synchrotron spectra, images, and polarization measurements from runaway electrons in the Alcator C-Mod tokamak. Poster, 45th EPS Conference on Plasma Physics, Prague, Czech Republic.

Jun 2018 *RA Tinguely, RS Granetz, M Hoppe, O Embréus, T Fülöp, S Scott, and RT Mumgaard.* Using SOFT and CODE to study spatiotemporal dynamics of runaway electrons in Alcator C-Mod. Contributed talk, 6th Meeting on Runaway Electron Modeling, Prague, Czech Republic.

May 2018 *RA Tinguely, RS Granetz, M Hoppe, O Embréus, and T Fülöp.* Spatiotemporal dynamics of runaway electrons in Alcator C-Mod. Selected talk, US Transport Task Force Workshop, San Diego, CA, USA.

Oct 2017 *RA Tinguely, RS Granetz, M Hoppe, O Embréus, A Stahl, and T Fülöp.* Synchrotron emission in Alcator C-Mod: Spectra at three magnetic fields, visible camera images, and polarization data. Poster, 59th Annual Meeting of the APS Division of Plasma Physics, Milwaukee, WI, USA.

Oct 2017 *RA Tinguely, RS Granetz, A Berg, AQ Kuang, D Brunner, and B LaBombard.* Halo current measurements using Langmuir 'rail' probes in Alcator C-Mod. Selected talk, ITPA MHD Workshop, Barcelona, Spain.

Jun 2017 *A Tinguely, RS Granetz, M Hoppe, O Embréus, A Stahl, and T Fülöp.* Synchrotron emission in Alcator C-Mod: Spectra at three B-fields and visible camera images. Contributed talk, 5th Meeting on Runaway Electron Modeling, Prague, Czech Republic.

Mar 2017 *A Tinguely, M Hoppe, O Embréus, A Stahl, T Fülöp, and R Granetz.* A first look at the spatial distribution of runaway electrons in Alcator C-Mod. Poster, 9th ITER International School on the *Physics of Disruptions and Control*, Aix-en-Provence, France.

Nov 2016 *A Tinguely, R Granetz, M Hoppe, A Stahl, and O Embréus.* Analysis of runaway electron synchrotron emission in Alcator C-Mod. Selected talk, session on *Research in Support of ITER*, 58th Annual Meeting of the APS Division of Plasma Physics, San Jose, CA, USA.

Jul 2016 *A Tinguely, R Granetz, and A Stahl.* Analysis of runaway electron synchrotron emission in Alcator C-Mod. Invited talk, 4th Annual Theory and Simulation of Disruptions Workshop, Princeton, NJ, USA.

Jun 2016 *A Tinguely, R Granetz, and A Stahl.* Analysis of runaway electron synchrotron emission in Alcator C-Mod. Contributed talk, 4th Meeting on Runaway Electron Modeling, Pertuis, France.

Nov 2015 *A Tinguely, R Granetz, A Stahl, and R Mumgaard.* Analysis of runaway electron synchrotron radiation in Alcator C-Mod. Contributed talk, 57th Annual Meeting of the APS Division of Plasma Physics, Savannah, GA, USA.

Nov 2013 *A Tinguely, A Dominguez, A Carpe, and A Zwicker.* Construction and implementation of a novel dust dropper for the PPPL Dusty Plasma Experiment. Poster, 55th Annual Meeting of the APS Division of Plasma Physics, Denver, CO, USA.

Service to profession

Peer review *Frontiers in Physics*; *Fusion Engineering and Design*; *IEEE Transactions on Plasma Science*; *Journal of Instrumentation*; *Journal of Plasma Physics*; *Nuclear Fusion*; *Physical Review Letters*; *Physics of Plasmas*; *Plasma Physics and Controlled Fusion*; *Plasma Science and Technology*; *Review of Scientific Instruments*; US Department of Energy, Office of Science, Fusion Energy Sciences, Office of Science Graduate Student Research Program

ITPEA *International Tokamak Physics and Engineering Activity*
US Member of the Energetic Particles Topical Group
Leader for the Topical Group on MHD, Disruptions and Control: MDC-26: RE Wave / MHD Interactions

Organizing committee High Temperature Plasma Diagnostics Conference, June 2026; Open-Source Software for Fusion Energy Conference, March 2026; SPARC Neutron Diagnostics Workshop, September 2022

Participant Private Facility Research Program Workshop, 29 February 2024; DOE FESAC Long Range Planning Workshop, 20 August 2020; US Magnetic Fusion Research Strategic Directions Workshop, 11-15 December 2017, Austin, TX

Thesis reader Lovepreet Singh, PhD, Jan 2025

Teaching and Mentorship

Present	Supervisor to MIT PhD students John Ball and Abby Feyrer, and PSFC postdoctoral associates Rishabh Datta, Justin Kunimune, and Lovepreet Singh; co-supervisor to MIT PhD student Shon Mackie, PSFC postdoctoral associates Enrico Panontin and Wenhao Wang, and technical associate Emily Edwards.
Previous	MSc student: Yiru Xiao (2025); PhD student: Leon Nichols (2025); Postdoctoral associates: Xinyan Wang (2022-2025), John Boguski (2023-2024); Visiting students: Marco Dalla Rosa (2024-2025)
2024-2025	Supervisor to undergraduate FUSar students Tori Hagenlocker, Emma Hopkins, and Daniel Lobelo - *In support of SPARC neutron diagnostics, Tori and Emma characterized novel fast (U238) and thermal (Li6) neutron detectors, respectively; Daniel explored multi-foil activation analyses.*
Summer 2023	Co-mentor to university students, Alexa Lachmann and Hongyu Zhang, during a three-month internship at the Princeton Plasma Physics Laboratory - *Alexa and Hongyu used the orbit-following codes SPIRAL and ASCOT, respectively, to calculate (and verify) the effects of Alfvén eigenmodes on the alpha particle distribution in SPARC.*
Summer 2021	Advisor to university student, Iyngkarran Kumar, for a three-month internship at the UK Atomic Energy Authority, carried out remotely due COVID-19 - *Iyngkarran assembled a database of destabilized Alfvén Eigenmodes in JET to discover empirical trends and compare with theory and simulation.*
Summer 2021	Co-advisor to university student, Anson Braun, for a three-month internship at the Princeton Plasma Physics Laboratory, carried out remotely due COVID-19 - *Anson used the orbit-following code SPIRAL to calculate the effects of neoclassical tearing modes on alpha particle confinement in SPARC.*
Spring 2021	Co-advisor to university student, Nathaniel Shields, for a three-month internship at Commonwealth Fusion Systems, carried out remotely due COVID-19 - *Nathaniel performed ASCOT orbit-following simulations to assess first wall heating of lost alpha particles in SPARC. His work has informed engineering tolerances for the vacuum vessel and limiters.*
Fall 2020	Advisor to university student, Victor Guillemot, for a five-month internship at the Culham Centre for Fusion Energy, carried out remotely due to COVID-19 - *Victor performed statistical and analytical analyses of "big data" collected by the Alfvén Eigenmode Active Diagnostic at JET. His work led to co-authorships on multiple publications including [Tinguely NF 2021a].*
Summer 2020	Instructor for the Middle East Entrepreneurs of Tomorrow program, held remotely due to COVID-19 - *Taught introductory Python online to 40 Israeli and Palestinian high school students. Created an inclusive and collaborative virtual learning environment.*
Fall 2018	Teaching Assistant for graduate-level course *22.63 Engineering Principles for Fusion Reactors*, taught by Prof. Dennis Whyte - *Advised five-person student team working on the blanket design (materials analysis, neutronics, thermal hydraulics) for a hybrid fusion-fission rocket and power plant. Guided organization and teamwork strategies.*

Spring 2018 Completed MIT's *Kaufman Teaching Certificate Program - Learned how to design courses and organize classes effectively, with emphasis on evidence-based practices, intended outcomes, active learning strategies, inclusive settings, and teaching philosophy. Practiced teaching with undergraduate and graduate students.*

Summer 2017 Instructor for the Middle East Entrepreneurs of Tomorrow program, based in Jerusalem - *Taught introductory Python to 85 Palestinian and Israeli high school students. Fostered a welcoming and collaborative learning environment.*

Spring 2017 TA/grader for graduate-level course *8.624 Plasma Waves*, taught by Prof. Miklos Porkolab - *Clarified content, led review sessions, and taught special topics during weekly recitations. Held office hours to meet with students one-on-one.*

Summer 2016 Co-advised high school student and summer intern, Alexandra Berg, through the Research Science Institute, Center for Excellence in Education - *Alexandra's work on halo currents led to her co-authorship on a publication [Tinguely NF 2018a]. She went on to complete her undergraduate degree at MIT.*

Fall 2015 TA/grader for graduate-level course *8.613J/22.611J Introduction to Plasma Physics*, taught by Prof. Anne White - *Assisted students with problem sets during weekly office hours.*

Honors and Awards

2023 Invited speaker, session on the *Future of Fusion*, MIT Energy Conference

2022, 2021, 2018, 2016 Selected speaker, session on *Research in Support of ITER*, APS DPP

2020 Workforce Development Highlight, US DOE Office of Science, Office of Workforce Development for Teachers and Scientists

2019 4th place, Harvard Black Hole Initiative essay competition, published in *Nautilus*

2018 Credited in the documentary *Imagination Off the Charts: Jacob Collier comes to MIT*, winner of a New England Emmy Award

2017 Participant, 9th ITER International School on the *Physics of Disruptions and Control*, Aix-en-Provence, France. Awarded travel grant by the US Burning Plasma Organization

2015-2017 Educational Outreach Award, MIT Plasma Science and Fusion Center

2014-2019 Energy Initiative Fellow, Massachusetts Institute of Technology

2014 Student Marshall and Convocation Speaker, College of Liberal Arts and Sciences, ISU

2014 Danielson Award, Department of Physics and Astronomy, ISU

2013 Ruth and Clayton Swenson Award in the Sciences, Phi Beta Kappa, Iowa Zeta Chapter

2013 Jun Ye and Huiquing Wang Award, Dept of Physics and Astronomy, ISU

2012 Schirber Scholarship, Department of Physics and Astronomy, ISU

2011/2012 Marian Daniells Scholarship, Department of Mathematics, ISU

2010-2014 University Honors Program, Iowa State University (ISU)

2010 Finalist, National Merit Scholarship

Activities

2025-2026	Volunteer at Y2Y Harvard Square, the first youth-led youth homeless shelter in the US
2023-present	Co-founder and Steering Committee member of the Working Group on Inclusion, Diversity, Equity, and Accessibility (IDEA) - *Hear IDEA ideas and concerns at MIT's Plasma Science and Fusion Center, and propose and advocate IDEA efforts to leadership.*
2022-present	Member of the choir Chorus pro Musica; performances in Carnegie Hall, Boston's Symphony Hall, TD Garden
2019-2021	Member of the Oxford Bach Choir; volunteer at the Gatehouse, Oxford
2016-2019	Co-leader and co-founder of the MIT Plasma Physics Graduate Student Group - *Elevated and promoted the status of Plasma Physics within the MIT Physics Department through self-advocacy, meeting with the departmental visiting committee, and inviting plasma physicists for department-wide colloquiua.*
2015-2019	Graduate Resident Tutor at Simmons Hall - *Lived with and mentored over 300 MIT undergraduate students. Served and advocated for the academic needs and personal well-being of my students.*
2014-2019	Outreach volunteer for the MIT Plasma Science and Fusion Center - *Coordinated and participated in various outreach efforts including tours of the Alcator C-Mod tokamak, booths at the MIT Energy Night, and demonstrations at the annual APS DPP Expo.*
2013	Summer intern, Princeton Plasma Physics Laboratory
2012	Summer intern, NASA Goddard Space Flight Center

Computational Skills

Languages	Proficient in Python, MATLAB, MDSplus, IDL, LaTeX Knowledge of Bash, SQL, Mathematica, Java
Software	ORBIT [White 1984 Physics of Fluids] NOVA-K [Fu 1994 Physics of Fluids B] ASCOT [Varje 2019 arXiv] CASTOR [Huysmans 1995 Physics of Plasmas] MISHKA [Mikhailovskii 1997 *Plasma Physics Reports*] CSCAS [Huysmans 2001 *Physics of Plasmas*] HELENA [Huysmans 1991 *International Journal of Modern Physics C*] GTC: Gyrokinetic Toroidal Code [Lin 1998 *Science*] SOFT: Synchrotron-detecting Orbit-Following Toolkit [Hoppe 2018 *Nuclear Fusion*] CODE: COllionsal Damping of Electrons [Landreman 2014 *Comp. Phys. Comm.*] GO+CODE [Hoppe 2020 *Journal of Plasma Physics*] MaxwellFDFD [Shin 2012 *Journal of Computational Physics*] MCNP6: Monte Carlo N-Particle [Goorley 2012 *Nuclear Technology*] OpenMC [Romano 2015 *Ann. Nucl. Energy*] AutoCAD, COMSOL, Office
Systems	Linux, Windows