

Emily Charles

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SUMMARY

Assistant project scientist and **experimental space physics** researcher with seven years of postdoctoral and project science experience developing energetic particle instruments for laboratory and spaceflight research. PhD trained physicist with hands on expertise in **space plasma physics**, detector design, fabrication, environmental testing, radioactive source evaluation, thermal vacuum campaigns, ground and **in flight calibration**, and scientific data analysis. Builds reliable **ground support equipment**, traceable QA records, calibration workflows, and technical reports that support hardware delivery against requirements. Published researcher with NASA and NSF flight investigation experience, federal proposal development, peer reviewed manuscripts, and analytical workflows in Python, IDL, and Matlab. Growing ownership across instrument development, research, mentoring, and product assurance supports meaningful contributions to experimental space physics programs.

EXPERIENCE

Project Scientist, Energetic Particle Instruments

July 2024 - Present

Heliospheric Instrumentation Laboratory

Boulder, CO

Lead detector characterization, electronics integration, **environmental verification**, calibration, research support, and **product assurance** for two spaceflight payloads. Mentor graduate researchers and guide technical evidence toward flight readiness.

- Led **detector characterization** and **electronics integration** for two energetic particle spaceflight payloads.
- Designed radioactive source ground equipment, creating repeatable evaluation procedures for flight hardware.
- Planned thermal vacuum sequences, investigated anomalous channels, and documented release dispositions.
- Built Python and IDL calibration pipelines supporting **response matrices** and in flight trending.
- Maintained QA records, controlled procedures, configuration notes, and verification reports for reviews.
- Co authored manuscripts and federal proposals while mentoring researchers in **uncertainty analysis**.

Associate Project Scientist

June 2022 - June 2024

Aurora Space Science Center

Fort Collins, CO

Owned fabrication, calibration, environmental testing, and performance evidence for a compact energetic particle instrument supporting NASA flight research. Connected laboratory results with integration decisions and science product readiness.

- Owned fabrication and calibration workstreams for a compact **NASA** supported flight instrument.
- Executed radioactive source and environmental tests, identifying corrective actions against acceptance criteria.
- Produced traceable **test reports** and delivered instrument articles for technical review and integration.
- Developed Matlab and Python routines for **calibration fitting** and **detector efficiency** studies.
- Supported **in flight calibration** planning, resolving channel normalization issues before science release.
- Contributed instrument performance analysis to publications and follow on federal proposals.

Postdoctoral Research Scientist

September 2020 - May 2022

Front Range Geospace Laboratory

Golden, CO

Developed energetic particle detector concepts, prototypes, test methods, and analysis products for space plasma investigations. Supported NSF flight work through calibration records, hardware summaries, anomaly studies, and publication ready science.

- Developed energetic particle detector concepts using laboratory measurements and response analysis.
- Fabricated prototype assemblies and established checkout, source testing, and calibration procedures.
- Operated ground support hardware with **IDL** and **Python** for automated detector tests.
- Evaluated spectra, thresholds, gain stability, and channel consistency across prototype configurations.
- Investigated environmental anomalies through controlled retesting of chamber and acquisition behavior.
- Published energetic particle research and presented instrument results to multidisciplinary teams.

Postdoctoral Research Associate, Space Plasma Physics

July 2019 - August 2020

Mountain West University

Albuquerque, NM

Conducted supervised space plasma research using energetic particle observations and laboratory detector measurements. Supported **faculty** and students with hardware, scientific software, reproducible analysis, technical procedures, manuscripts, and presentations.

- Conducted supervised space plasma research using energetic particle observations and detector measurements.
- Created Python and **Matlab** workflows for reproducible instrument data processing.
- Performed radioactive source evaluations and quantified detector response and uncertainty.
- Prepared laboratory procedures connecting test objectives, acquisition settings, methods, and performance.
- Contributed manuscripts and conference presentations on energetic particle signatures and limitations.
- Supported graduate **students** with laboratory hardware, software, and **data analysis** methods.

PROJECTS

Energetic Particle Flight Calibration 📅 2024

Established calibration workflows for energetic particle assemblies, combining response matrices, in flight trending, and traceable evidence for science interpretation.

Thermal Vacuum Detector Verification 📅 2023

Structured thermal vacuum testing for detector hardware, linking chamber sequences, telemetry review, anomaly investigation, and release documentation.

LEADERSHIP & AWARDS

- NASA Flight Investigation Contributor, recognized for sustained energetic particle instrument support and delivery of flight readiness evidence.
- NSF Heliophysics Research Contributor, acknowledged for calibration products, detector analysis, and collaborative publication work.
- Graduate Research Mentor, trusted by laboratory teams for practical guidance in detector testing and uncertainty analysis.

EDUCATION

PhD in Physics 2019

University of New Mexico GPA: 4.0 Albuquerque, NM

Coursework: Space plasma physics, energetic particle instrumentation, detector physics, scientific data analysis

Bachelor of Science in Physics 2013

Colorado State University GPA: 4.0 Fort Collins, CO

Coursework: Classical mechanics, electromagnetism, quantum mechanics, experimental physics

CERTIFICATIONS

- NASA System Safety Fundamentals 📅 2025
- Laboratory Radiation Safety Training 📅 2026

TECHNICAL SKILLS

- **Programming Languages:** Python, IDL, Matlab
- **Detector Instrumentation:** Energetic particle detectors, detector electronics, response matrices
- **Space Plasma Physics:** Space plasma physics, energetic particle analysis, heliophysics
- **Environmental Testing:** Thermal vacuum testing, environmental verification, chamber testing
- **Calibration Methods:** Ground calibration, in flight calibration, detector efficiency
- **Ground Support Equipment:** Radioactive source equipment, test fixtures, acquisition hardware
- **Data Analysis:** Spectral analysis, calibration fitting, uncertainty analysis
- **Quality Assurance:** QA documentation, configuration control, verification reports
- **Flight Programs:** NASA flight projects, NSF flight projects, flight investigations
- **Research Communication:** Peer reviewed manuscripts, federal proposals, technical reports

SKILLS

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|----------------------------------|------------------------------|--------------------------|---------------------|
| • Space plasma physics | • Thermal vacuum testing | • QA documentation | • IDL |
| • Energetic particle instruments | • Radioactive source testing | • Product assurance | • Matlab |
| • Detector design | • Ground calibration | • Flight project support | • Federal proposals |
| • Instrument fabrication | • In flight calibration | • Python | |

PROFESSIONAL AFFILIATIONS

- American Geophysical Union, member supporting space physics research exchange and scientific publication.
- American Physical Society, Division of Plasma Physics, member engaged with experimental plasma instrumentation.

LANGUAGES

- English (Native)
- Spanish (Intermediate)

ADDITIONAL INFORMATION

Work Status : Authorized to work in United States. No sponsorship required.

REFERENCES

AVAILABLE ON REQUEST