

NASA rocket discovers new energization process in upper atmosphere

July 23 2024, by Miles Hatfield



A timelapse of the Twin Rockets to Investigate Cusp Electrodynamics (TRICE-2) mission launching from Andøya Space Center in Andenes, Norway on Dec. 8, 2018. Credit: NASA/Jamie Adkins

When it comes to discoveries about our upper atmosphere, it pays to know your surroundings.

Using data from the Twin Rockets to Investigate Cusp Electrodynamics (TRICE-2) [rocket launch](#), NASA scientists Francesca Di Mare and Gregory Howes from the University of Iowa studied waves traveling down Earth's magnetic field lines into the polar atmosphere.

These waves were known to accelerate electrons, which pick up speed as they "surf" along the electric field of the wave. But their effect on [ions](#)—a more heterogenous group of positively charged particles, which exist alongside electrons—was unknown.

By estimating the ion mixture they were flying through—predominantly protons and singly charged oxygen ions—the scientists discovered that these waves were accelerating protons as they circle about the Earth's magnetic field lines as well as electrons as they surf the waves. The [findings](#), published in *Physical Review Letters*, reveal a new way our [upper atmosphere](#) is energized.

More information: Francesca Di Mare et al, New Regime of Inertial Alfvén Wave Turbulence in the Auroral Ionosphere, *Physical Review Letters* (2024). [DOI: 10.1103/PhysRevLett.133.045201](https://doi.org/10.1103/PhysRevLett.133.045201)

Provided by NASA

Citation: NASA rocket discovers new energization process in upper atmosphere (2024, July 23) retrieved 23 July 2024 from <https://phys.org/news/2024-07-nasa-rocket-energization-upper-atmosphere.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.