



Astronova Fellow

Aafaque Khan

Ph.D. Candidate, Astronomy and Astrophysics,
University of Arizona



RESEARCH

Building ultraviolet-detecting space instruments to map the invisible gas halos that shape galaxies.

YEAR AWARDED

2026

HOST INSTITUTION

University of Arizona

 [PROFESSIONAL WEBSITE](#)

"The new space era gives us an unprecedented opportunity to study the universe in ways we never could before. I'm interested in building constellations of space telescopes—networks of specialized instruments working in concert—that can produce the first comprehensive maps of the universe in ultraviolet light. No single mission can do this alone. But a constellation can."

- Aafaque Khan

Aafaque Khan builds teams the way he builds satellite instruments: specialized, collaborative, and ready to take leaps that advance science and careers.

Mr. Khan's passion for astronomy began at age 14, when he led programs for people of all ages and education levels as a community outreach volunteer. He taught schoolteachers—whose students were his own age—to build telescopes for their classrooms. Working in communities rich in ambition but limited in resources, he developed a lasting drive to make valuable scientific tools simpler and less expensive.

In time, he was building his own space telescopes to study the universe. As an undergraduate, Mr. Khan assembled a 40-student team to design a miniature, modular satellite that could detect extreme-ultraviolet radiation from the Sun. After graduating, he served as lead engineer of the Solar Ultraviolet Imaging Telescope on Aditya-L1, a space-based solar observatory of the Indian Space Research Organization.

Today, Mr. Khan focuses on building technologies to study galaxies and the vast expanse of gas surrounding them like a halo. Known as the circumgalactic medium, this diffuse reservoir of gas and dust that envelops galaxies fuels star formation while absorbing the energy and matter galaxies expel. Despite its outsized role in shaping how galaxies grow and change, this gas remains largely uncharted. The ultraviolet and higher-energy wavelengths it emits are beyond the reach of most current space observatories.

Mr. Khan leads instrument optical integration for Aspera, a NASA Astrophysics Pioneers mission comprising a minifridge-sized satellite with dual spectrographs—instruments that break light into its component wavelengths—purpose-built to observe the UV light of the circumgalactic medium. His research also focuses on improving the UV efficiency of detectors in collaboration with NASA's Jet Propulsion Laboratory.

As an Astronova Fellow, Mr. Khan will create Aspera's first ultraviolet maps of the circumgalactic medium while advancing the detector technology needed for next-generation space telescopes. This includes developing Skipper CCDs—sensors that repeatedly read each pixel to suppress electronic noise, achieving sensitivity down to individual photons.

Applying lessons learned from Aspera, Mr. Khan will then lead development of Mileva, a constellation of small, specialized satellites working together to map the circumgalactic medium in ultraviolet light. Mr. Khan is especially drawn to small-satellite projects, which allow faster iteration, lower-cost experimentation, and hands-on training for more early-career scientists. A devoted mentor to students from diverse backgrounds, he is driven to bring new people and perspectives to the forefront of science.

Mr. Khan will receive his Ph.D. in astronomy and astrophysics from the University of Arizona in July 2026.

