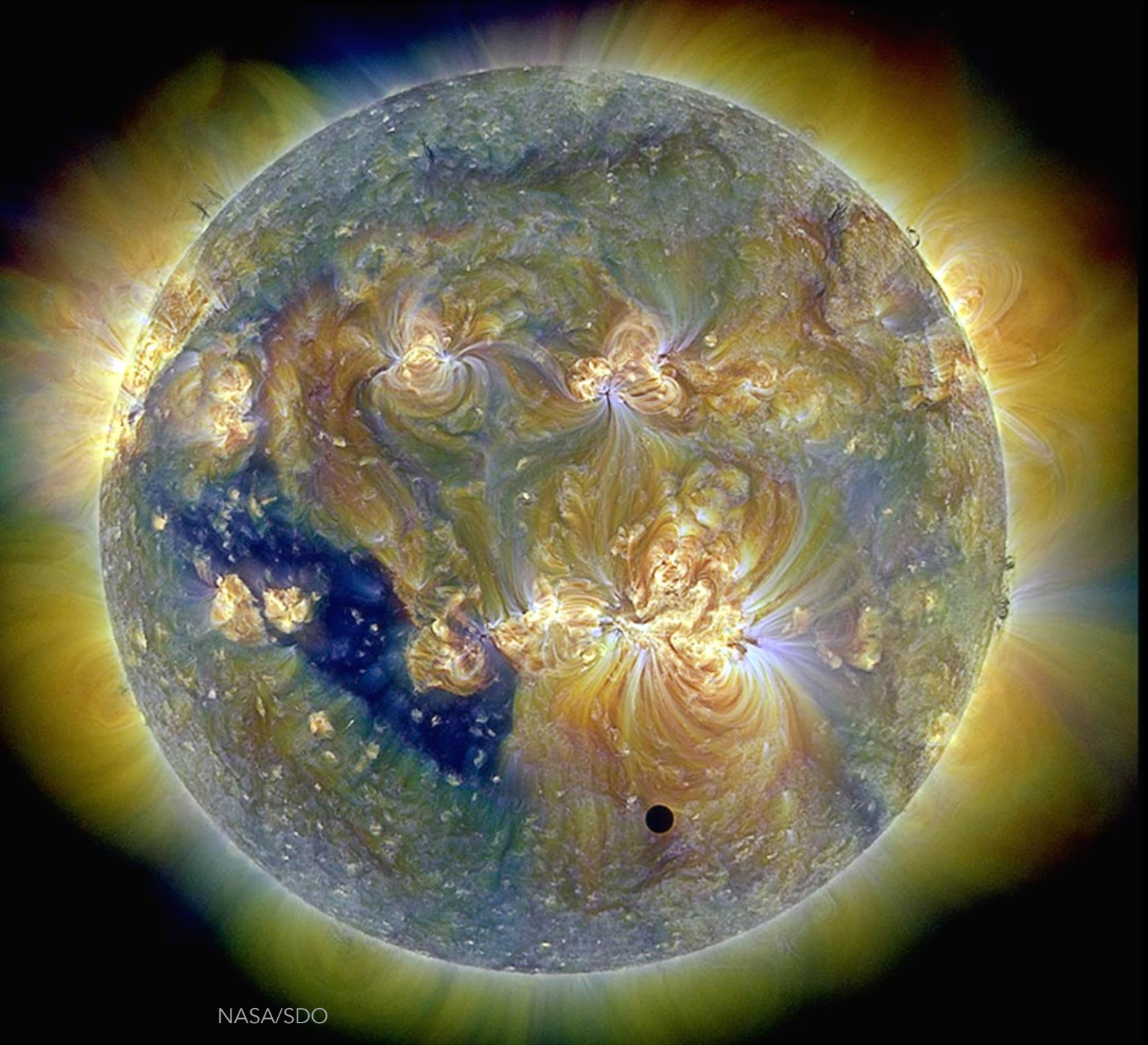

New UV Spotlights on Exoplanets with SPARCS & UV-SCOPE

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Star-Planet Activity Research Cubesat

OVERVIEW

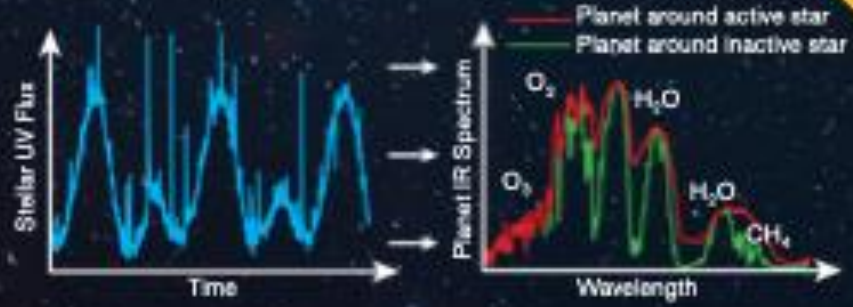
Mission SPARCS will be the first ever mission dedicated to monitoring the high-energy radiation environments of exoplanets throughout their lifetimes by continuously and simultaneously measuring the FUV and NUV emission of low-mass stars from young to old.

Technology SPARCS will advance UV detector technology by flying state of the art '2D-doped' detectors and metal dielectric filters.

Education SPARCS is training the next generation of scientists and engineers in mission development, operations, and data analysis.

DELIVERABLE SCIENCE

SPARCS will determine the high-energy radiation environment around the most common types of exo-planet hosts. By measuring month-long light curves in two UV bands, SPARCS will map stellar activity due to flares and stellar rotation. These data are crucial to understand the evolution and habitability of planets and for interpreting their spectra and atmospheres.



KEY SPECIFICATIONS

Spacecraft: 6U CubeSat, 9 cm telescope

Orbit: Sun synchronous terminator for continuous power, cooling, and uninterrupted observations

Bands: FUV [153 - 171 nm] and NUV [258 - 308 nm]

FOV: 0.7°

Photometric Requirements: 1% to 10% per observation

Pointing: Stable to <6"

Cadence: 0.1 - 60 min observations
5 - 45 days per M star

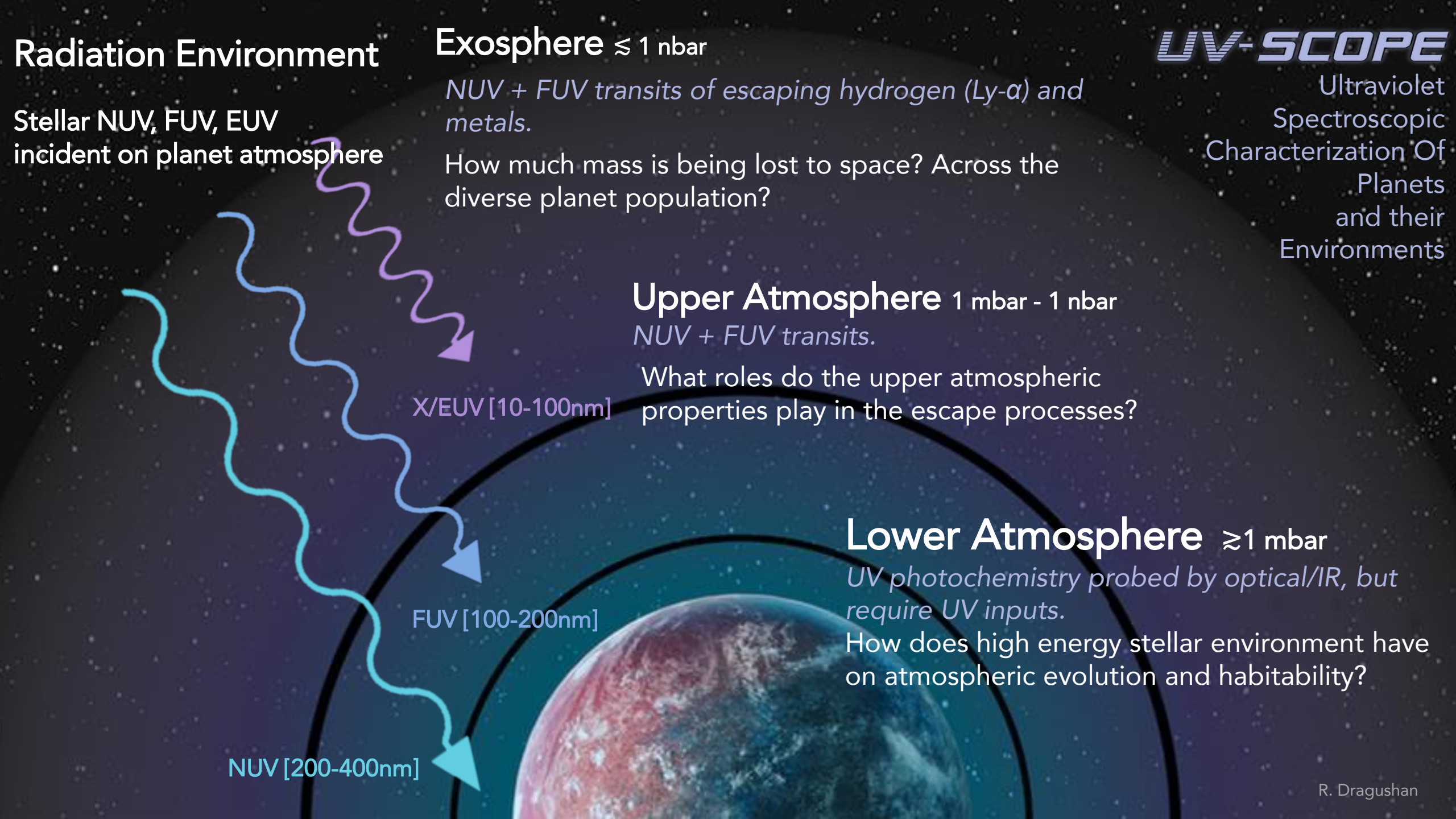
ASU

W

SwRI

NASA

JPL

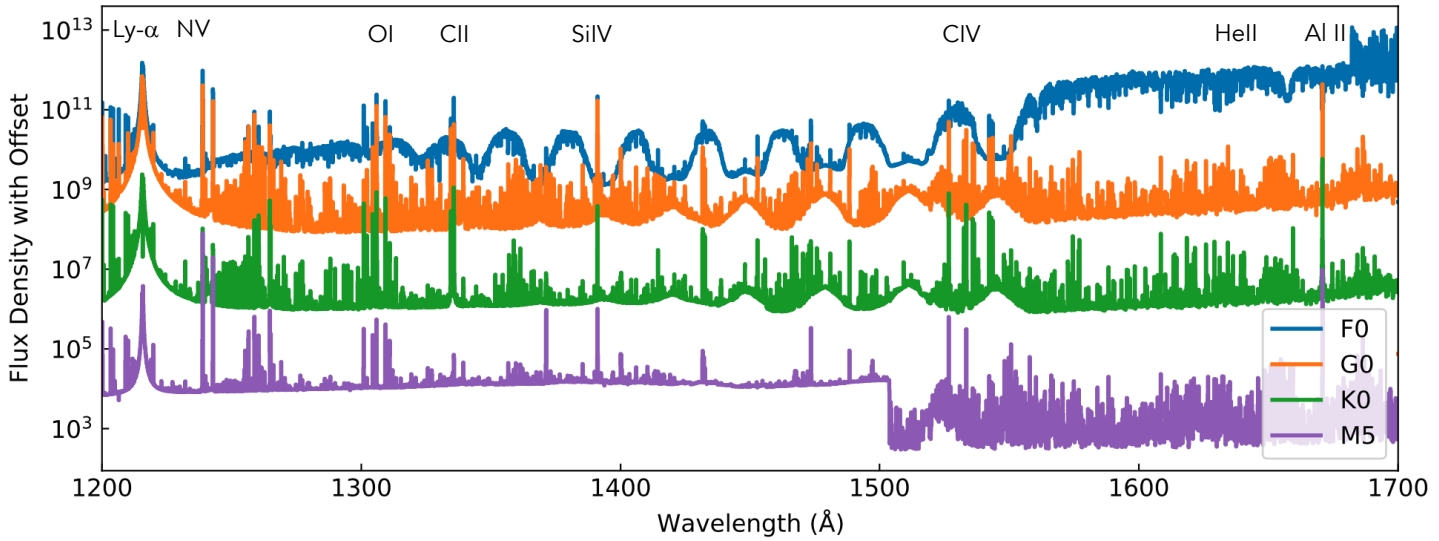

Radiation Environment
Stellar NUV, FUV, EUV incident on planet atmosphere
Exosphere ≲ 1 nbar
NUV + FUV transits of escaping hydrogen (Ly-α) and metals.
How much mass is being lost to space? Across the diverse planet population?
UV-SCOPE
Ultraviolet Spectroscopic Characterization Of Planets and their Environments
Upper Atmosphere 1 mbar - 1 nbar
NUV + FUV transits.
What roles do the upper atmospheric properties play in the escape processes?
X/EUV [10-100nm]
FUV [100-200nm]
NUV [200-400nm]
Lower Atmosphere ≳1 mbar
UV photochemistry probed by optical/IR, but require UV inputs.
How does high energy stellar environment have on atmospheric evolution and habitability?
R. Dragushan

UV-SCOPE Spectra

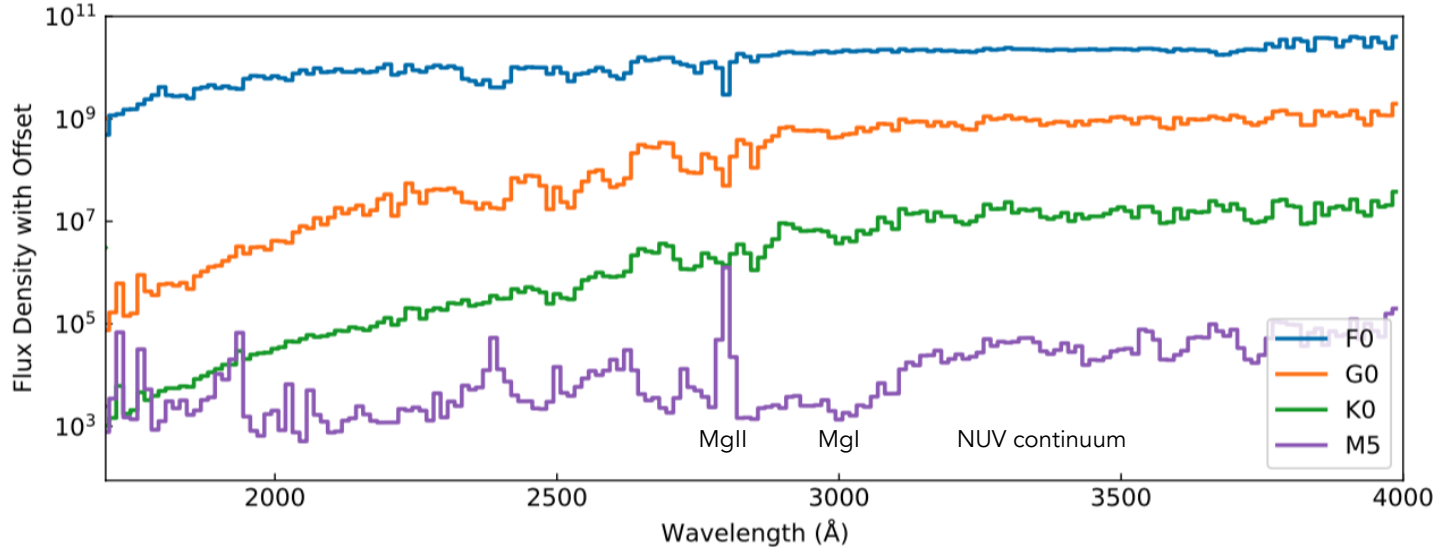
A 60 cm telescope

Two-armed, long-slit, FUV+NUV spectrograph

High-QE delta-doped detectors



FUV channel
R=6000



NUV channel
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