Finding Life: Spectral Biomarkers in Planetary Atmospheres

Initiative: Freigeist-Fellowships

Bewilligung: 03.07.2017

Laufzeit: 5 Jahre

Projekt-Website: www.elsaesserlab.space

Are we alone in the Universe? Are there other solar systems with planets like our Earth? The search for extrasolar planets is currently in full swing. Over 2000 exoplanets have been detected by the Kepler space telescope alone and more are to be found in the coming years. The next great challenge is to determine whether these potentially Earth-like planets also harbour life. But what should we search for? Which signs of life could we detect while being light years away? Spectroscopically resolving atmospheric features of exoplanets is the most promising way forward. Understanding atmospheric processes and chemical pathways of biosignatures is key to identify biogenic molecules and interpret correctly exoplanetary spectra. This research programme aims to investigate photochemical processes in planetary atmospheres by performing experiments in a ground based planetary simulation chamber as well as in space, either attached to the outside of the International Space Station or on free-flying nanosatellites. Mimicking atmospheric parameters such as pressure, temperature, gas composition in a given radiation environment will allow us to understand better the spectroscopic fingerprints of biogenic molecules. Results will be fed back into model calculations and will serve astronomers as a target list of atmospheric biosignatures to find possible traces of life on other planets.

Projektbeteiligte

Dr. Andreas Elsaesser
Freie Universität Berlin
Experimental Molecular Biophysics
Berlin

Open Access-Publikationen

Biosignature stability in space enables their use for life detection on Mars
Infrared nanoscopy and tomography of intracellular structures
Spectroscopy on CubeSats and SmallSats." In Next Generation CubeSats and SmallSats
Mars Simulation Facilities: A Review of Recent Developments, Capabilities and Applications
Future space experiment platforms for astrobiology and astrochemistry research