



The Impact of Space Weather on the Atmosphere of Proxima Centauri b

Vanessa Schmidt and Miriam Sinnhuber

Karlsruher Institut für Technologie, Karlsruhe, Germany

Proxima Centauri is an M-dwarf star and the Sun's nearest stellar neighbor. It is orbited by a planet within its habitable zone at a distance of approximately 0.05 AU. Due to the planet's close proximity to its host star and the comparatively high stellar activity of Proxima Centauri, it is subjected to stellar energetic particles fluxes many times higher than those received on Earth - with potentially considerable implications for the planet's atmosphere. In our work, we study the interaction of ionizing radiation with a potential atmosphere of Proxima Centauri b in order to quantify the impact of stellar radiation on molecules influenced by biogenic processes such as ozone, nitrous oxide, and methane. Using a 1-dimensional stacked box column model of the neutral and ionized atmosphere, we can obtain the production rates of several important neutral species, which allows us to determine the long time effect of stellar activity on the atmospheric concentrations of bioindicators. This research is a joint operation between the University of Kiel, the Technical University Berlin and the Karlsruhe Institute of Technology and funded by the DFG.