



## **Explosion-combustion in exoplanetary atmospheres**

John Lee Grenfell (1), Mareike Godolt (2), Barbara Stracke (1), Stefanie Gebauer (1), Heike Rauer (1,2)

(1) Dept. Extrasolar Planets and Atmospheres, German Aerospace Centre (DLR), Berlin, Germany, (2) Centre for Astronomy and Astrophysics (ZAA), Berlin Institute of Technology (TUB), Berlin, Germany

Conditions leading to explosion or/and combustion in exoplanetary atmospheres are investigated for different atmospheric composition, temperature and pressure. Cases considered are Super-Earths orbiting in the habitable zone of M-dwarf stars with atmospheres consisting of abiotically-produced molecular oxygen together with molecular hydrogen accreted from the protoplanetary disk. Should these atmospheres undergo hydrogen-oxygen combustion triggered by e.g. lightning or cosmic rays, this would limit the build-up of abiotic oxygen, lower the hydrogen gas envelope and could lead to liquid oceans with masses tens to hundreds of times larger than on the Earth. We also consider other explosive-combustive gas mixtures which could lead to carbon monoxide or methane combustion in the atmospheres of some Mini Gas Planets or in (Early) Earth-like atmospheres.