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The impact of time-dependent stellar activity on the atmospheric chemistry and observability of exoplanets

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Observations of exoplanets used to characterize the chemistry and dynamics of atmospheres have developed considerably throughout the years. Nonetheless, it remains a difficult task to give a full and detailed description using solely observations. With future space missions such as JWST and ARIEL, both expected to be launched within this decade, it becomes even more crucial to be able to fully explain and predict the underlying chemistry and physics involved. In this research, we focus on modeling star-planet interactions by using synthetic flare spectra to predict chemical tracers for future missions. We make use of a chemical kinetics code that includes synthetic time-dependent stellar spectra and thermal atmospheric escape to simulate the atmospheres of known exoplanets. Using a radiative transfer model we then retrieve emission spectra. This ongoing study is focused on various known planetary systems of which the stellar spectrum has been obtained by the (mega-)MUSCLES collaboration. Preliminary results on these systems show that stellar flares and thermal escape can have a significant effect on the chemistry in atmospheres.