Modelling the photosphere of active stars
Poster : yes

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Stellar activity in late-type stars induces photometric modulations and apparent radial velocity variations that may hamper the detection of Earth-like planets. Its effect on the photosphere is seen in the form of spots and faculae, whose relationship with stellar parameters is still not well understood. Significant improvement in our knowledge of activity effects on starlight will be crucial to make the most of present and future planet search instruments and space missions. In this work we present a methodology to simulate spectra from the spotted photosphere of a rotating star. We use the atmospheric PHOENIX models to generate synthetic spectra for the stellar surface, spots and faculae. The spectrum of the entire visible face of the star is obtained by summing the contribution of a grid of small surface elements. We consider their individual Doppler shifts and limb darkening coefficients and include the different contributions to the convective blueshift seen in the cross-correlation function. Using such simulator time series spectra can be obtained covering the rotation period of the star or longer. Our results allow us to investigate the effects of activity patterns on the measurable stellar flux and hence define the best strategies to optimize exoplanet search and measurement experiments.