
Spectropolarimetric view of the lower atmosphere of red supergiant stars : from magnetic fields to scattering polarisation

Benjamin Tessore*¹

¹Laboratoire Univers et Particules de Montpellier (LUPM) – CNRS : UMR5299, Université Montpellier II - Sciences et techniques, IN2P3 – Université de Montpellier II Place Eugène Bataillon - CC 72 34095 Montpellier Cédex 05, France

Abstract

The massive and cool red supergiant stars (RSG) present an inhomogeneous photosphere covered by a small number of giant convective cells, as shown by simulations and unveiled by interferometric observations (see Montargès' talk). In these convective cells a local dynamo generating a magnetic field is likely to operate.

Besides, the continuum of RSG stars is linearly polarised due to Thomson and Rayleigh scattering and has been measured from broadband polarimetry to be at the percent level.

Recently, imprints of this polarisation, for the RSG star Betelgeuse, in spectral lines have been discovered. Existence of continuum polarisation is related to anisotropies in the radiation field and its observability is due to inhomogeneities at the surface of the star.

In this talk, I will present the latest results on the detection of a weak magnetic field at the surface of three RSG stars and I will show the potential of continuum polarisation to study the surface of RSG star and to probe the outer region of their lower atmosphere.

*Speaker