Zeeman Doppler imaging of a cluster Bp star HD 133880

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Abstract

The bright star Bp star HD 133880 (HR Lup) is a member of the Upper Centaurus Lupus association with a well determined age of 16 Myr. This object shows an unusual phase variation of the longitudinal magnetic field, indicating a departure from an axisymmetric dipolar field topology. In line with this evidence, previous studies of this star suggested that it hosts a dominant quadrupolar magnetic field component. We have carried out a comprehensive high-resolution spectropolarimetric analysis of HD 133880 based on observations collected with the HARPSpol instrument at ESO. Applying Zeeman Doppler imaging to this dataset reveals a simpler and weaker magnetic field than claimed in the literature. Taking into account ZDI results obtained for other Ap/Bp stars, we conclude that there is no evidence for the existence of purely quadrupolar axisymmetric magnetic fields on stellar surfaces. This agrees with the results of numerical simulations of fossil field evolution in radiative stellar interiors.

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