ON THE ESTABLISHMENT OF INTERNALLY CONSISTENT ABUNDANCE-OSCILLATOR STRENGTH SCALES

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Abstract

The method of establishing of internally consistent abundance-oscillator strength scales by using solar fraunhofer lines is elaborated and investigated.

The error of internal accuracy should not exceed 0.05 - 0.06 dex. The absolute accuracy depends on the accuracy of "reference" gf-values.

The oscillator strengths for about 800 Fe I lines are obtained. The comparison of the results for 19 lines common in our and Blackwell et al. (1976) investigations gives the difference $\log gf_{Black} - \log gf_{auth} = \Delta = -0.044 \pm 0.010$. The accidental part of the difference actually determines the internal accuracy of the obtained oscillator strengths.

The Kurucz and Peytremann (1975) oscillator strengths for Fe I lines are analysed. Large systematic errors depending on gf and excitation potential are revealed and investigated. For some lines those errors may change the true values of gf by two orders of magnitude.

DIFFERENTIAL ROTATION AND MAGNETIC ACTIVITY OF THE LOWER MAIN SEQUENCE STARS

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Abstract

We extend to the lower main sequence stars the analysis of convection interacting with rotation in a compressible spherical shell, already applied to the solar case (Belvedere and Paterno, 1977; Belvedere et al. 1979a). We assume that the coupling constant ε between convection and rotation, does not depend on the spectral type. Therefore we take ε determined from the observed differential rotation of the Sun, and compute differential rotation and magnetic cycles for stars ranging from F5 to M0, namely for those stars which are supposed to possess surface convection zones (Belvedere et al. 1979b, c, d). The results show that the strength of differential rotation decreases from a maximum at F5 down to a minimum at G5 and then increases towards later spectral types. The computations of the magnetic cycles based on the αω-dynamo theory show that dynamo instability decreases from F5 to G5, and then increases towards the later spectral types reaching a maximum at M0. The period of the magnetic cycles increases from a few years at F5 to about 100 years at M0. Also the extension of the surface magnetic activity increases substantially towards the later spectral types. The results are discussed in the framework of Wilson's (1978) observations.

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CHANGES OF PHOTOSPHERIC LINE ASYMMETRIES WITH EFFECTIVE TEMPERATURE

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Abstract

Asymmetries in photospheric lines were described briefly in my earlier contribution to these proceedings and in more detail in the January 15, 1980 issue of the Ap. J. The cores of the stronger lines in α Boo (K2III) show a blue shift, quite opposite to the effect seen in the solar lines. Suspecting this difference to be due to the

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