GRANULATION OBSERVATIONS

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The analysis of high resolution spectrograms that were obtained in Capri with the Coudé refractor gave the following results regarding the granular fields.

a) The rms velocity of the granulation was 300 m/sec. This value represents the raw data and should be substantially increased to account for instrumental and seeing effects (W. Mattig et al., 1969). Note that the oscillatory component of the total velocity field has been eliminated by a numerical filter.

b) In the photosphere the intensity and velocity fluctuations show a similar structure. The size distributions of the observed Doppler shifts and intensity variations have been studied by means of power spectrum analysis (Fig.1, W. Mattig and A. Nesis, 1974). These spectra are not corrected for finite instrumental resolution or for atmospheric seeing.

The question that we put to the theorists is which of the current models of convection is able to interpret these observations? Should one resort to the anelastic approximation for convection to study our data, or must one work with the thermals picture, to limit oneself to just two examples?

Since we can arrive at an understanding of the granulation only by careful and systematic observations, I believe that a practically orientated dialogue between theory and observations is indispensable.

References

Mattig, W., Mehltretter, J.P., and Nesis, A.: 1969, Solar Phys. 10, 254
Mattig, W., and Nesis, A.: 1974, Solar Phys. 36, 3

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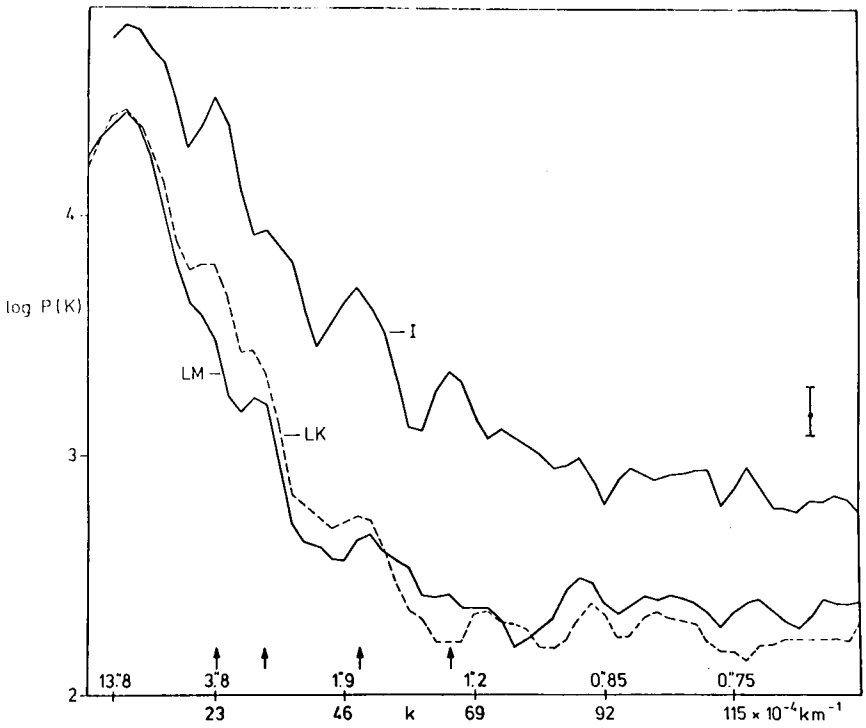

Fig. 1. The power spectrum of the intensity I(x) and of the velocity v(x)
L.K.: continuum levels, L.M.: Line center

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