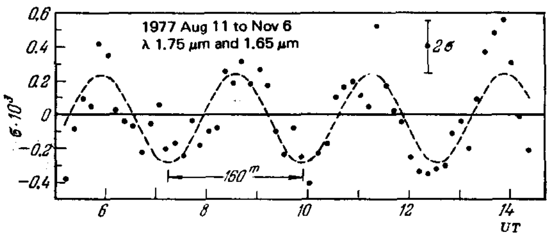
V. A. Kotov and S. Kuchmi, *Investigation of the sun's brightness variations*. The spectrum of the observed solar oscillations, leaving aside the familiar 5^m oscillations, spans the range of periods from 7^m to 70^m (Hill *et al.*[1]) and 160^m (Severnyĭ *et al.*[2]). Oscillations with the latter period are of special interest, since they have exhibited phase coherence for five years, from 1974 through 1978.[3]

In 1976, Crimean investigators[4] and, at the same time, Hill[5] advanced the opinion that the observed oscillations should be accompanied by fluctuations in the limb-darkening relation. An attempt to record these fluctuations was made in the Crimea[6] and it was found that there appear to be variations of the sun's brightness in visible light with a period of 160^m and a relative amplitude of about 10^{-3}, which would correspond to photospheric temperature fluctuations of $\approx 1°$.

Our experiments were made in the near infrared (IR) ($\lambda = 1.75$ and 1.65 μm), which was found preferable because of the weak influence of the Earth's atmosphere in its transparency windows and because this emission corresponds to the absorption minimum of the sun's photosphere. A special electromechanical linear modulator that scans the sun's disk with a frequency of 20 Hz was developed and used; the amplitude of a variable signal proportional to the "center-to-limb" brightness



difference was detected at twice the frequency (40 Hz) and calibrated in units of the intensity at the center of the disk.

The power spectrum constructed from the 1977 observations (32 days, total of about 152 hours of measurement) indicated that one of the strongest peaks lies in the region of 160^m. Further, real-time (*UT*) averaging of all of these measurements also brought out a distinct 160^m periodicity of the differential ("center-to-limb") signal $\delta = \Delta I/I$ with an amplitude of $\approx 2.5 \cdot 10^{-4}$ (see figure; a sinewave with a period of 160^m has been drawn through the points by least squares). This gives a ±1° variation of the effective temperature and is consistent with data from the optical region of the spectrum.[6] The average IR brightness curve for the period $160^m.010$ is given in Fig. 1 of Ref. 7.

Thus, our result indicates that the IR brightness fluctuations with the 160^m period of the sun's pulsations are real.

A new result was recently obtained by Eryushev *et al.*, who made a series of radiobrightness measurements at wavelengths of 1.9–3.5 cm on the RT-22 radio telescope in 1977–1978. Here again, the relative ("center-to-limb") signal was found to fluctuate with a period of 160^m and a radio-flux amplitude $\Delta I/I \approx 10^{-3}$, which corresponds to ±10° radiotemperature variations.

The observed periodic (160^m) variations of emission from the sun's upper photosphere and chromosphere are apparently due to deviations from adiabaticity as the waves propagate in these layers, a possibility that Hill *et al.*[8] feel merits serious attention.

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[3]P. H. Scherrer, J. M. Wilcox, V. A. Kotov, A. B. Severny, and T. T. Tsap, Nature **1979**, v. 277, p. 635.
[4]V. Kotov, A. Severny and T. Tsap, in Proceedings of XVI General IAU Meeting, Grenoble, 1976—1977, P. 244.
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