CONNECTION BETWEEN THE SLOPE OF BRIGHTNESS-PHASE CURVE AND LUNAR ALBEDO.

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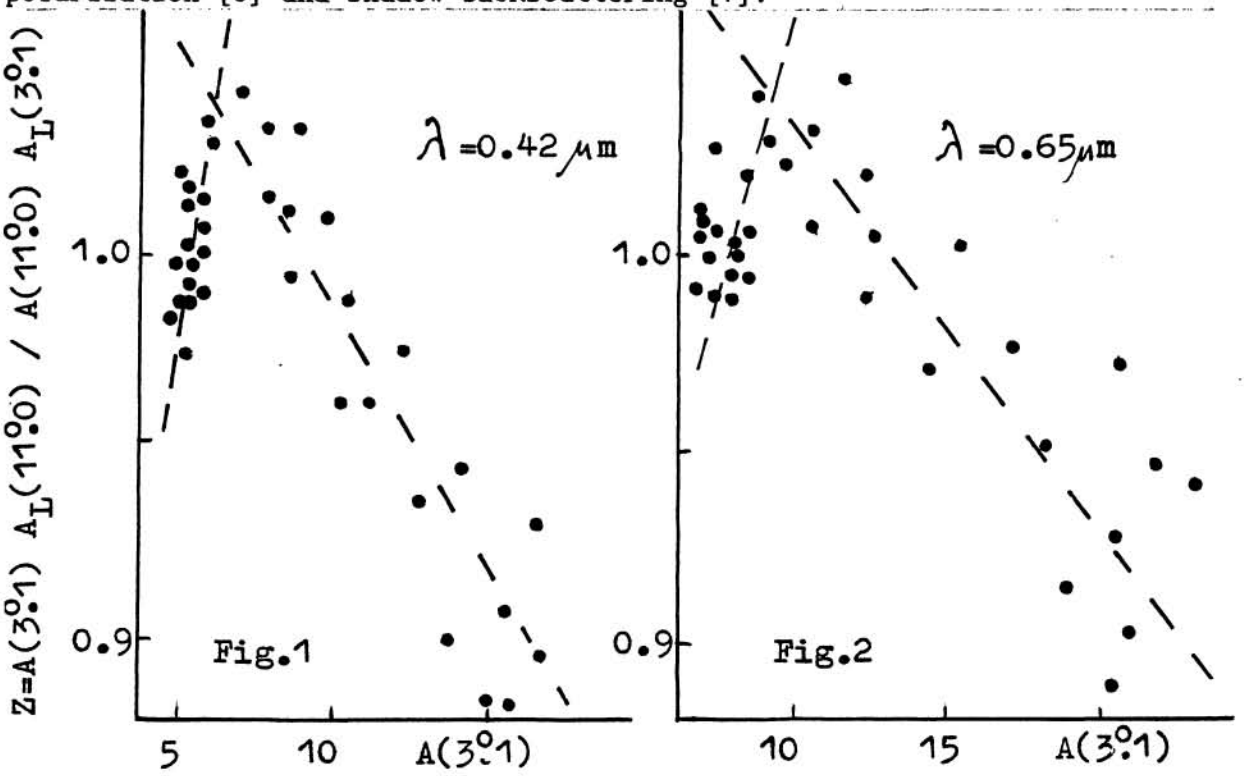
Reliable data which enabled to find out whether the correlation between the slope of the brightness-phase dependence near the opposition and lunar albedo exists were not obtained so far. New experimental data clarifying the situation are presented.

PHOTOMETRY OF SOME LUNAR REGIONS. Photometric observations for several lunar regions of 10" diameter at wavelength $\lambda=0.42\mu m$ and $0.65\mu m$ at phase angles 10.5° and 3.1° where carried out using photometer-polarimeter [1] based on 60-cm telescope. The slope of the brightness - phase curve was estimated by the formula $Z = \{A(3.1^\circ)/A_L(3.1^\circ)\} / \{A(10.5^\circ)/A_L(10.5^\circ)\}$ where A is albedo of the region at the indicated phase angles and A_L is the same for the center of crater le Monnier. To calculate $A(\alpha)$ we used Akimov's formula [2] which takes into account brightness distribution over lunar disk in following form:

$$F(\alpha,l) = \frac{\cos\{(\pi(1-\alpha/2)/(\pi-\alpha)\}\cos\alpha/2}{\cos l}$$

Here l is a photometric longitude, α is a phase angle. As shown in the Fig.1 and 2 Z-A dependences for mentioned wavelengthes are disintigreated in two branches marked with dotted line. It is interesting that qualitatively the same dependence was observed for the minimal polarization ($|P_{min}|$) - albedo (A) diagramm [3,4]. Owing to that a correlation between $|P_{min}|$ and Z may be expected. Realy, that is right [5]. These important facts cannot be explained in a frame of geometric optics theories of the negative polarization [6] and shadow backscattering [7].



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IMAGES OF THE PHASE DEPENDENCE BRIGHTNESS SLOPE. Albedo image of Mare Nectaris region albedo at phase angle 3.5° is shown in the Fig.3. North - South line is directed from left to right. Fig.4 is the image of the slope of brightness - phase dependence for the same region obtained by the method described in [8]. The most bright areas mean the greatest phase dependence slope. Comparison of the Fig.3 and 4 qualitatively confirm the character of the diagram *Z-A*: direct *Z-A* correlation is observed on the level "mare - continent" and the correlation disappear (or is even inversed) for the beam system and bright craters.

Fig.3

Fig.4

LABORATORY DATA. Two branches of *Z-A* dependence are obtained in laboratory measurements (Fig.5).

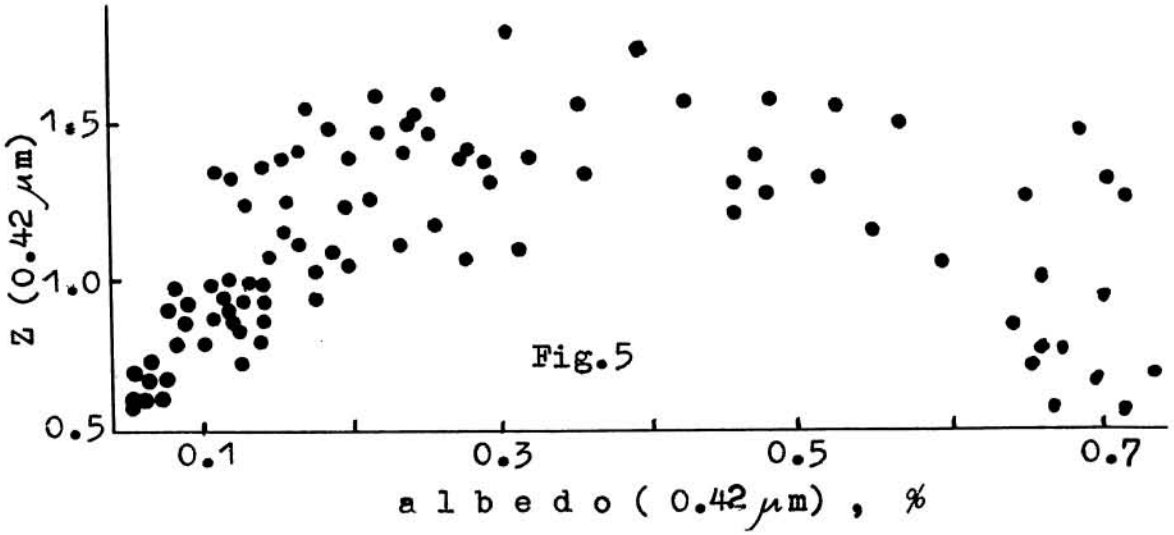

Fig.5

They are results of photometry of large series of water-color mixtures by photometer-polarimeter [9].

References:

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