IS THERE POLARIMETRIC Q-EFFECT FOR THE MOON, ASTEROIDS, AND LABORATORY ARTIFICIAL SAMPLES?

Yu.G.Shkuratov, N.V.Opanasenko, and N.S.Olifer
Astronomical Observatory of Kharkov University,310022,Kharkov,USSR.

It's well known that h (a slope of polarization phase curve at the inversion angle) depends on A (an albedo of scattered surfaces) [1]. It is naturally to expect the same correlation between Q ($Q = h(\lambda_1)/h(\lambda_2)$) and C ($C = A(\lambda_2)/h(\lambda_1)$) where λ is wavelength. However studies [2] showed no Q-C correlations for asteroids, lunar regions, and terrestrial samples. This strange fact was called Q-effect [2]. Recently we have obtained a new experimental data which showed that Q-effect is perhaps an artefact.

REVISED DATA FOR ASTEROIDS. A Q-C diagram for asteroids including data mentioned in [2] as nonreliable is plotted on Fig.1. In this case we have an allusion to slight correlation between Q and C [3].

NEW LUNAR DATA. Spectro-polarimetric and spectrophoto-metric observation of the Moon were carried out using polari-metric facility [4] based on 60-cm telescope. Diagram is shown in Fig.2. We can see a slight correlation as for asteroid case. Problems concerning reality of lunar Q-C correlation can be solved by means of laboratory polari-metric measurement.

LABORATORY DATA. Q-effect is checked using measurements of a large series of artificial samples which are mixtures of water-colour substances of a fine structure (see Fig.3). For the measurement we used a laboratory polarimeter [5]. Owing to wide dispersion of structural and optical para-meters of the samples a rather strong correlation between Q and C was obtained, which is qualitatively similar to that of the Moon and asteroids.

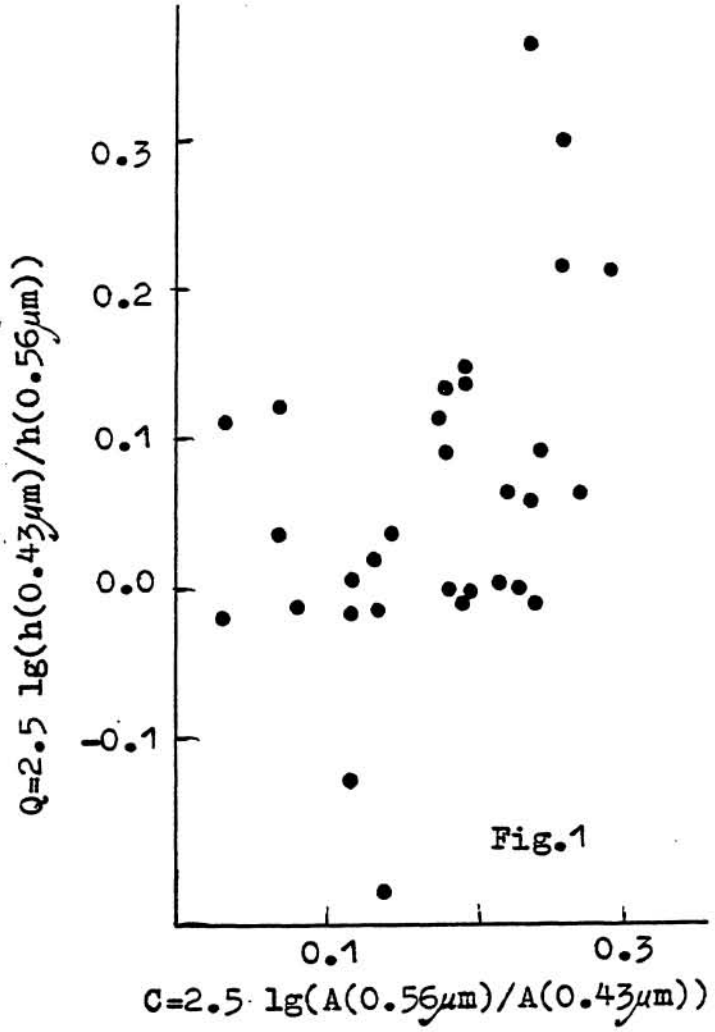
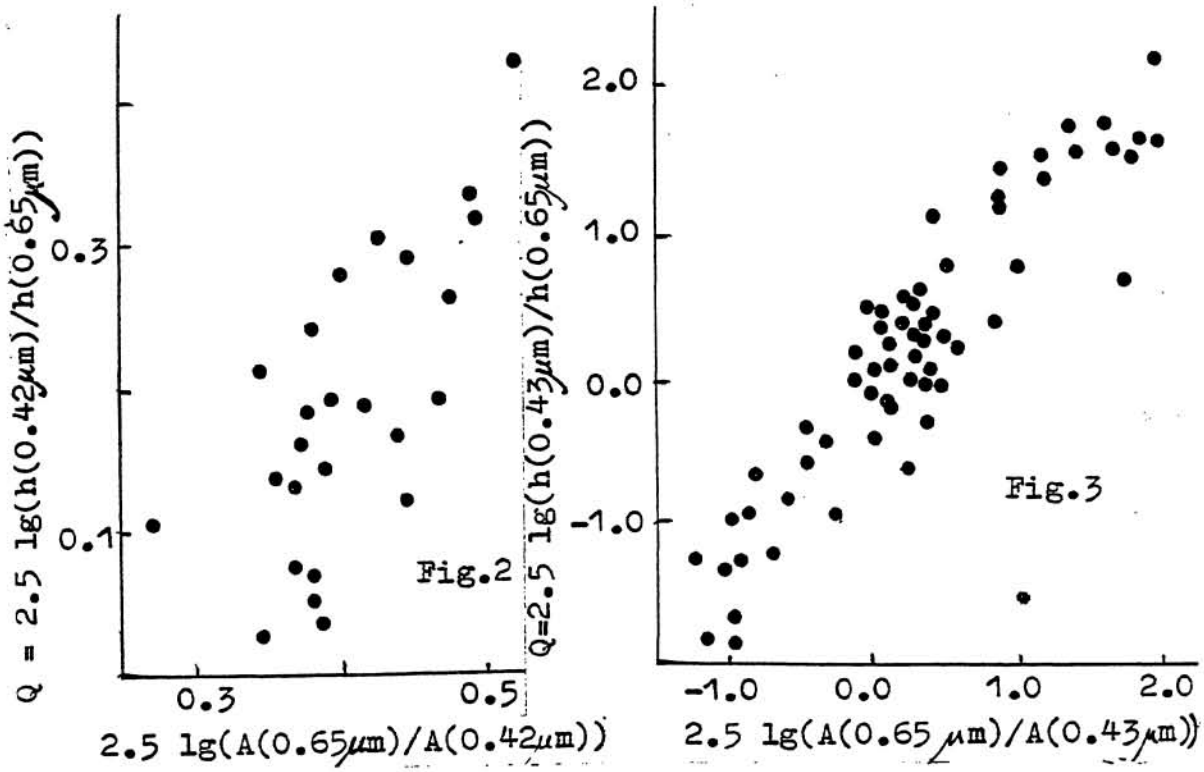


Fig.1

IS THERE POLARIMETRIC Q-EFFECT?

Shkuratov Yu.G. et al



DISCUSSION. We suggest that the represented facts contradict Q-effect. *Q-C* correlation is natural phenomenon because it results from *h-A* correlation i.e. from Umov's law. The weakness of the correlations for asteroids and the Moon apparently follows from both errors of the measurements and real structural features of scattering surfaces.

References.

1. Veverka J. *In:Planetary satellites. Ed.J.A.Burns,Tucson,Arizona,1977.*
2. Zellner B.,Gradie I. *Astron.J.,1976,v.81,no.4,p.262-280.*
3. Shkuratov Yu.G. et al. *Astron.vestnik,1984,v.18,no.3,p.163-177* (in Russian).
4. Bugaenko O.I., Guralchuk A.L. *In: Photometric and polarimetric investigations of celestial bodies. Ed. Morozhenko A.V. Kiev: Naukova Dumka,1985,p.160-164* (in Russian).
5. Shkuratov Yu.G.et al *Kinematika i Fizika Neb.Tel,1987,v.3,p.32-37* (in Russian).