OCCULTATION OF THE STAR SAO 187255 BY TITAN:
TITAN'S ATMOSPHERE. Ju.V.Alexandrov, F.P.Velichko,
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On July 3, 1989, Titan occulted SAO 187255, a K2-type star
with visual magnitude 5.8. Photoelectric observations of the oc-
cultation were carried out at the 70-cm telescope of the Kharkov
Astronomical Observatory in standard band B. The highspeed
pulse-counting one-channel photometer was equipped with FEU-79 ( 5-8
cathode ) photomultiplier tube. We could set one integration per
6 ms in a continuous sequence. Each integration was stored sequ-
entially in the personal computer memory.

Unfortunately it was impossible to synchronize the highspeed
photometer clock to UT and to get the eclipse, beginning time at
high accuracy. We have only the estimations 22\textdegree 37.1\pm 0.2 UT.
The smoothing occultation curve contained 2800 points with
resolution of 193 ms. The measured duration was 314.01 sec at the
0.5 intensity level. We supposed that the occultation was central.

According to our measurements at least four light absorptive
layers were observed in Titan's atmosphere with the probability of
0.99 at the heights of about 330, 500, 610 and 750 km (the Titan's
solid surface radius was assumed to be equal 2575 km), which cor-
responds to /1/.

The further reductions were taken using the model which took
into account the Titan's atmospheric extinction due to the atmo-
spheric refraction. The changes in gravity and temperature with
heights /2/ were considered, too.

The average value of molecular weight $\mu =24.6 \pm 0.4$ was ob-
tained. The statistical significant difference of the value in
upper and lower parts of the height interval, where the measure-
ments were made, was found. The Table lists the data of the two
parts. Column 1 contains intervals of real heights, column 2 -
changes in heights of a homogeneous atmosphere $H$ in the model,
column 3 - values of molecular weight. The last column contains
mass concentration of metan in assumption that the main components
of Titan's atmosphere are nitrogen and metan. One can see that
one fourth of the whole amount of metan in Titan's atmosphere is
condensed into the cloudy layers which are formed at the heights
of 300 - 750 km.

<table>
<thead>
<tr>
<th>Height interv., km</th>
<th>$H$, km</th>
<th>$\mu \pm \sigma_\mu$</th>
<th>m(CH$_4$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>200 - 750</td>
<td>40-60</td>
<td>25.1 $\pm$ 0.8</td>
<td>0.15</td>
</tr>
<tr>
<td>750 - 1050</td>
<td>65-80</td>
<td>24.3 $\pm$ 0.9</td>
<td>0.20</td>
</tr>
</tbody>
</table>

T.Gehrels and M.S.Metthews, Univ. of Arizona Press, Tucson,
1984, 671-759.