The difference increases for the spheroids located at the ends of the octahedron.

Table

Direction	Lax model	Lomer model	Present results	Results by other methods
[100]	0.608	0.602	0.592	0.603 [4]
[111]	0.232	0.250	0.244	0.265 [3]
[110]	0.257	0.284	0.296	

It must be noted that the model proposed by Lax for the Fermi surface of molybdenum is in somewhat poorer agreement with our experimental results.

We consider it our pleasant duty to thank V. P. Naberezhnykh for valuable advice and discussion, to L. N. Aleksandrov for help in constructing the experimental setup, and G. P. Kovtun for supplying the pure molybdenum.

[1] E. Fawcett and D. Griffiths, J. Phys. Chem. Solids 23, 1631 (1962).
[2] E. Fawcett, Phys. Rev. 128, 154 (1962).
[3] P. A. Bezuglyi, S. E. Zhevago, and V. I. Denisenko, Zh. Eksp. Theor. Fiz. 49, 1457 (1965) [Sov. Phys.-JETP 22, 1002 (1966)].
[4] D. M. Sparlin and J. A. Marcus, Phys. Rev. 144, 484 (1966).
[5] W. M. Lomer, Proc. Phys. Soc. (London) 80, 489 (1962).
[6] W. M. Lomer, Proc. Phys. Soc. (London) 84, 327 (1964).
[7] V. F. Gantmakher, Zh. Eksp. Teor. Fiz. 44, 811 (1963) [Sov. Phys.-JETP 17, 549 (1963)].
[8] I. P. Kryplov and V. F. Gantmakher, Zh. Eksp. Teor. Fiz. 51, 740 (1966) [Sov. Phys. JETP 24, 492 (1967)].
[9] V. P. Naberezhnykh and A. A. Maryakhin, Phys. Stat. Sol. 20, 737 (1967).
[10] J. F. Koch and T. K. Wagner, Phys. Rev. 151, 467 (1966).
[11] A. Fukumoto and H. W. P. Strandberg, Phys. Lett. 23, 200 (1966).

EFFECT OF ROTATION ON THE DENSITY OF He II

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Submitted 17 July 1967
ZhETF Pis'ma 6, No. 7, 741-743 (1 October 1967)

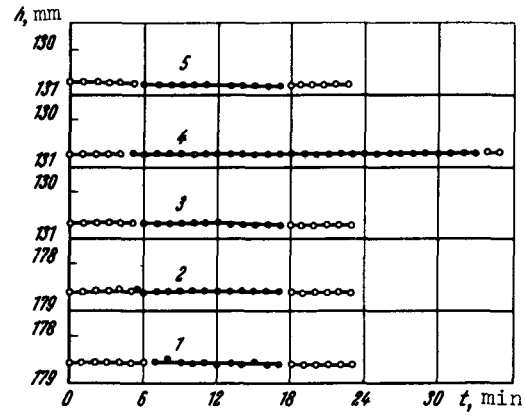
Andronikashvili and Tsakadze [1-4] reported observation of condensation of rotating He II and a jump in its density on going through T_λ while in the rotating state. Since this result greatly affects the answer to the question of the nature of the phase transition in rotating helium, we deemed it advisable to repeat these experiments under conditions of a precisely stabilized and controlled temperature, and using a more sensitive pycnometer.

The pycnometer * used in the present work consisted of a small copper bulb of 21.1 cm^3 volume soldered to a glass capillary 0.056 cm in diameter and 20 cm long. The helium was admitted into the pycnometer through a thin-wall capillary of stainless steel, of 1 mm diameter, which was disconnected from the inlet system during the rotation by means of a valve located outside the dewar. The volume occupied by the gas phase was 0.5 cm^3. The pycnometer was rotated by an electric motor equipped with a reduction gear specially developed for this purpose, which made it possible to vary the speed of rotation continuously from 0 to 32 sec^{-1}, the angular velocity being kept constant within 0.3%. The accuracy with which the He II level in the capillary could be read with a KM-6 cathetometer was 0.02 mm at standstill and 0.05 mm during rotation, making it possible to register a relative density change equal to 5×10^{-7}.

In view of the importance of temperature stability in the change of the helium density,

we used an electronic thermal regulator similar to that used in [5], which maintained the temperature constant within 7×10^{-5} °K. The temperature stability was checked with a carbon resistance thermometer located in the helium bath. The measuring circuit could sense a temperature change of 4×10^{-5} deg.

The measurements were made in the temperature interval 1.74 - 2.13°K at speeds up to 31.4 revolutions per second.



Level of He II in pycnometer at specified temperatures and angular velocities vs. the time. 1 - T = 1.86°K, ω = 29.3 sec^{-1}; 2 - T = 1.86°K, ω = 24.5 sec^{-1}; 3 - T = 1.74°K, ω = 3.14 sec^{-1}; 4 - T = 1.74°K, ω = 29.3 sec^{-1}; 5 - T = 1.74°K, ω = 26.5 sec^{-1}. o - helium at standstill, • - rotating He II.

The measurement results are shown in the figure, where the ordinates represent the positions of the He II level in the capillary at specified temperatures T and angular velocities ω, and the abscissas represent the time. The light circles correspond to helium at standstill and the full ones to rotating helium. As seen from the figure, rotation has no effect on the position of the helium level in the capillary under the indicated conditions. This means that the relative change of the helium density in the investigated temperature and angular velocity interval does not exceed 5×10^{-7}, whereas according to the data of [1-4] a relative increase in density by $\sim 3 \times 10^{-4}$ should be observed at 1.74°K and 30 sec^{-1} (such an increase in density would correspond to a lowering of the level in our pycnometer by ~27 mm).

A change in the He II level in the pycnometer capillary was observed only when the stability of the helium-bath temperature was upset.

Thus, our measurements have shown that rotation has no effect on the density of He II.

It should be noted that this conclusion is confirmed also by the results of [6-8], with which we became acquainted after completing the described experiments.

The authors are grateful to N. P. Biryukov for the great skill with which he constructed the mechanical part of the instrument.

[1] E. L. Andronikashvili and D. S. Tsakadze, ZhETF Pis. Red. 2, 278 (1965) [JETP Lett. 2, 177 (1965)].
[2] E. L. Andronikashvili and J. S. Tsakadze, Phys. Lett. 18, 26 (1965).
[3] E. L. Andronikashvili and D. S. Tsakadze, Zh. Eksp. Teor. Fiz. 51, 1344 (1966) [Sov. Phys.-JETP 24, 907 (1967).
[4] E. L. Andronikashvili and J. S. Tsakadze, Phys. Lett. 20, 446 (1966).
[5] B. N. Esel'son, I. F. Bogatyrev, V. G. Ivanov, and R. I. Shcherbachenko, Zh. Eksp. Teor. Fiz. 52, 380 (1967) [Sov. Phys.-JETP 25, 247 (1967)]

[6] J. Andelin, Phys. Rev. Lett. 19, 483 (1967).
[7] E. Smith, R. Walton, H. V. Bohm, and J. D. Reppy, Phys. Rev. Lett. 18, 637 (1967).
[8] R. A. Bablidze, A. A. Galkin, and V. P. D'yakonov, Paper at 14th All-union Conference on Low-temperature Physics, Khar'kov, 1967.

* L. M. Livshitz took part in the construction and adjustment of the instrument.

INTERACTION OF IMPURITY TIN IN TRANSITION-METAL MATRICES

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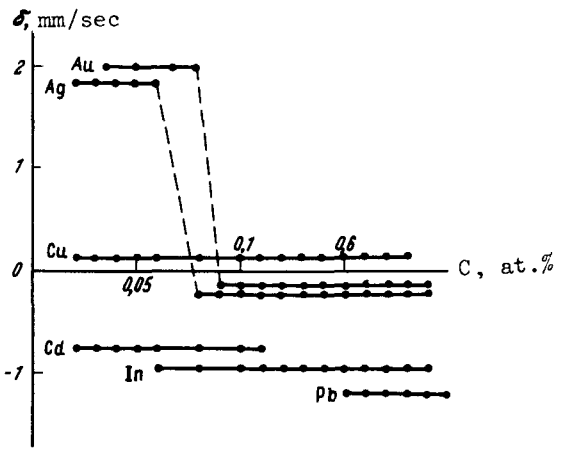
ZhETF Pis'ma 6, No. 7, 743-745 (1 October 1967).

Even in the early investigations in which the Mossbauer effect was used to determine the isomer shifts of impurity tin nuclei in metallic systems it was assumed unconditionally that these quantities are connected with the electronic properties of the investigated objects. So far, however, no definite correlation was found between the isomer shifts and the properties of the band structure of the investigated systems. Furthermore, if the content of the Sn^{119m} impurity atoms is ~1 at.%, it is not clear as yet whether they should be regarded as isolated or whether their interaction with one another is already sufficiently large at this concentration.

To ascertain the nature of the isomer shift of impurity tin nuclei in normal metals, we determined these quantities for Pb, In, Cd, Cu, Ag, and Au matrices containing from 0.02 to 1 at.% radioactive Sn^{119m}. The samples were prepared by fusing the investigated metal with 1 at.% of Sn^{119m} in an evacuated quartz ampoule. The metal purity was not worse than 99.999%, with the exception of Ag, where the purity was 99.99%. Smaller Sn^{119m} concentrations were obtained by diluting the alloy. The prepared alloys were rolled into foil and annealed in vacuum for two hours. The samples served as the γ-quantum sources, and the absorber was magnesium stannide. The source and absorber were kept at liquid-nitrogen temperature. The spectra were plotted with a mechanical setup at constant speed. The spectra were singlet and their half-width was not determined precisely. The results are shown in the



Isomer shift of Sn^{119m} nuclei relative to Mg_2Sn in Au, Ag, Cd, In, Pb, and Cu matrices as a function of the tin density C. The shift values were determined accurate to ±0.02 mm/sec.

figure. An unexpected behavior of the shift was observed in the case of Ag and Au, and at low tin concentrations (up to 0.06 at.% for Ag and up to 0.08 at.% for Au) the shifts were