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ABSTRACTS OF ARTICLES ON LOW TEMPERATURE PHYSICS, NUCLEAR PHYSICS,  
COSMIC RAYS, AND ACOUSTICS PUBLISHED IN CZECHOSLOVAK PERIODICALS



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Abstracts of pertinent articles on the subjects indicated in the above title, covering the three-year period 1949-1951, are given below. A survey of available Czechoslovak periodicals revealed that the only likely source of such information was the periodical "Matematiky a Fysiky." However, even this source was found to contain information which appears to be based either completely, or to a considerable extent, on Western work.

Matematiky a Fysiky

Vol 73, No 4, 1948

(No information)

Vol 74, No 1, 1949

a) pp D5-D14

"Physics of Low Temperatures. Part I: Methods of Cooling" Dr. Ivan Simon [Shimon], Cambridge, Mass, US [Table of Contents gives Shimon's (presumably John Simon) location as Praha -- evidently, on leave from MIT]

Abstract: Summarizes previous Western work on low temperatures with emphasis on 3 basic cooling methods: 1) latent heat of saturated vapor 2) adiabatic expansion of compressed gas 3) Joule-Thompson effect.

b) pp D14-D20

"Remarks on the Scattering of Neutrons in Moderators," Dr. Vilem Santholzer, Praha.

Abstract: Derives well-known equation for mean logarithmic energy loss per collision of neutron with nucleus. Also derived approximate formulas used by

E. Fermi and F. L. Friedman for computation of average number of collisions required to slow down a 1 Mev neutron to thermal energy. Bibliography refers to works by J. Cork, C. Goodman, H. L. Anderson and E. Fermi, F. L. Friedman, R. D. Evans, and previous article by author in Rozhledy matematicko-prirodovedecke, 26, 133, 1947.

Vol 74, No 2, 1949

(Entire issue devoted to joint meeting of Polish and Czech mathematicians which was held 28 Aug - 4 Sep 1949).

Vol 74, No 3, 1949

(Continuation of previous issue on joint meeting of Polish and Czech mathematicians)

Vol 74, No 4, 1949

(Continuation of previous issue on joint meeting of Polish and Czech mathematicians)

Vol 75, No 1, 1950

a) pp D105-D108

"The Use of Diamonds as Detectors of Radioactive Radiation," Engr Cestmir Simane [Chestmir Shimanye]. Physics Institute, Karlova University, Prague.  
Abstract: Describes experiments carried out at the Physics Institute to determine characteristics of diamonds in comparison with ionization chambers. Bibliography lists 13 Western articles and one by V. Petrzhilka, Fysika v technice, 3, No 7-8, 220, 1948.

b) pp D111-D112

"Lecture by Prof Cosyns in Prague" reported by Engr Cestmir Simane, Prague.  
Abstract: Describes high-points of lecture given on 2 Nov 1949 by Prof Cosyns at the Physics Inst of Karlova University on the subject of cosmic rays, his field of specialty at his own institute in Brussels.

Vol 75, No 2, 1950

a) pp 89-95

"On the Theory of Characteristic [Eigen] Energy of an Electron," Ivan Ulehla, Praha.

Abstract: Refers to paper by F. J. Belinfante appearing in Physical Review (1949, Vol 76, p 226) and notes that his use of Fermi quantum electrodynamics without the usual elimination of longitudinal and scalar photons for his calculation of the energy of an electron does not yield a single-valued result. Shows how this can be overcome by suitable definition of the function of a free photon field, yielding an expression which diverges logarithmically similarly to that obtained by Weisskopf.

b) pp D158-D171

"Physics of Low Temperatures. Part II: Super-Conductivity," Dr. Ivan Simon

Abstract: Presents brief survey of the experimental as well as theoretical aspects of the problem of interpreting experimental data on superconductivity in terms of the theories of electronic conduction in metals. Most of the 22 items in the bibliography are of pre-World War II Western origin.

c) p D224

"Measurements in the Field of Ultrasonics." Lecture presented by RN Dr. Frantisek Kozumplik on 4 May 1950 in Prague.

Translation: Ultrasonic generators can be divided into 3 groups: 1) galton siren, 2) electric spark, electric arc, 3) rods and plates under (a) mechanical (b) magnetostrictive and (c) piezoelectric effects. However, a particular generator in one of these groups need not be in the ultrasonic range although it may generate fairly high frequencies. For example, with generators in group 3(a) and (b) frequencies of 8 kc can be obtained.

In group 3(c), two ultrasonic generators were produced. The first one was manufactured by the Chirana Plant (National Enterprise) and 14th of May Plant in Brno. Its frequency was 367 kc as determined by a differential tone calibrated against an oscillator. For a quartz slab thickness of 0.775 cm and at the indicated frequency, an X-cut crystal was selected. The quartz plate and holder are submerged in an oil bath; the maximum ultrasonic energy measured in the oil was 140 watts. It was also shown, by means of a simple arrangement using a circular quarter-wave reflector suspended on a scale balance, that fixed [standing?] waves are created not only in the oil bath but also in the liquid remaining in the filler spout. From the measured wavelength and frequency, the velocity of the ultrasonic wave in the given liquid can be determined. The values obtained show an error of 1%, in extreme cases 2%, in comparison with the value given in the literature.

In the second generator, a frequency of 6.12 Mc was measured with a quartz slab thickness of 0.033 cm. In this case a Y-cut crystal was used. The quartz slab and holder were placed in a container to which various liquids could be added. The ultrasonic wavelength was determined from the maxima of monochromatic light of the yellow lines of helium. From the wavelength and frequency, the calculated velocity of the ultrasonic waves in various liquids showed an error, in comparison with values given in the literature, of less than 0.5%, in most cases 0.3%.

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