The wave nature of matter: from the diffraction of particles in crystals to the interferometer of Kapitza – Dirac – Talbot – Low

© E.V. Smirnov

Bauman Moscow State Technical University, Moscow, 105005, Russia

The work deals with the experimental methods of researches of the wave properties of the particles. It was noted that, in the case of large molecules, molecular weight of which exceeds 10^3 *amu, the most adequate is the study of the wave properties of the particles with the help of the interferometer Talbot-Law (ITL). Additional advantages in the interference contrast of the interference picture gives the unification of the ITL with the effect of Kapitza – Dirac – diffraction of particles on the standing light wave. The interferometer Kapitza-Dirac-Talbot-Low (IKDTL) allows exploring the wave properties of molecules, molecular weight of which is several thousand amu. Application of this method for the study of the wave properties of the more massive particles is discussed.*

Keywords: *the wave nature of matter, the de Broglie wave, the Talbot effect, the Kapitza – Dirac effect.*

Smirnov E.V. graduated from Moscow Institute of Physics and Technology in 1972. Ph.D., Senior Reserchер of the Department of Physics of Bauman Moscow State Technical University. Area of scientific interests: interaction of radiation with matter, diffraction of Mossbauer radiation in crystals, quantum physics, physical bases of nanotechnology. Author of more than 90 publications. e-mail: seva09@rambler.ru