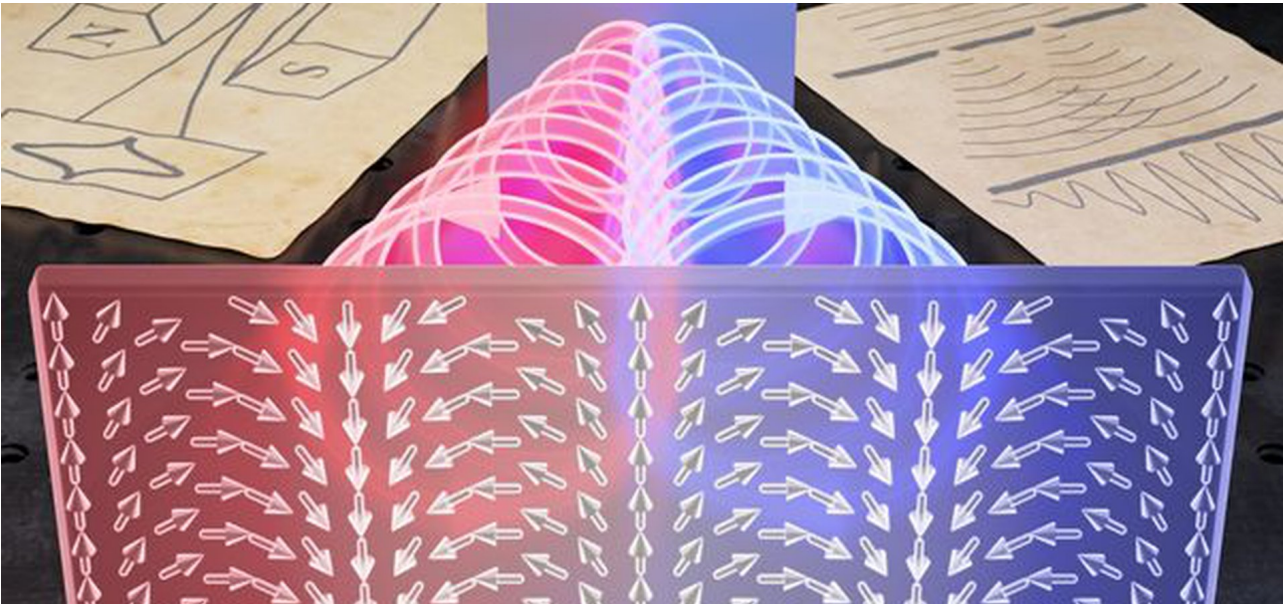


Optical research in inverse space awarded in a prestigious journal



The optical analogy of the Stern-Gerlach experiment and Young's experiment in the reciprocal space - these are pioneering research conducted in an interinstitutional team using microcavities developed and made at the Military University of Technology. The published work on this subject was awarded by the editor of "Physical Review Letters" and was included in the prestigious group of articles "PRL Editors' Suggestion".

Laboratory studies of optical phenomena are conducted at the Faculty of Physics of the University of Warsaw in cooperation with the Institute of Physics of the Polish Academy of Sciences and the University of Southampton. A special optical microcavity filled with liquid crystal material of high birefringence was manufactured at the Military University of Technology. The micro cavity and liquid crystal materials were developed and made by: prof. Witold Piecek, prof. Przemysław Kula, dr Rafał Mazur, dr Przemysław Morawiak from the Faculty of New Technologies and Chemistry of the Military University of Technology.

In the latest joint article, scientists from the University of Warsaw, Military University of Technology, Institute of Physics PAS and Southampton demonstrated for the first time Young's experiment with light, carried out in the reciprocal space.

During the tests, light was observed leaving the cavity in the form of two beams diverging in two different directions, each of the beams being circularly polarized; right- or left-handed. On the sample surface (i.e. in the position space), an interference pattern of light polarization states was observed for the overlapping beams leaving the microcavity, composed of parallel stripes with a given linear polarization.

Currently, scientists have shown that an experiment similar to Young's experiment can be carried out in the space of directions (i.e. in the above-mentioned reciprocal space) - then the beams coming from two directions should also give a periodic interference pattern in space.

The statement that the optical microcavity with a liquid crystal separates the polarization of light (photon spin) almost coincided with the hundredth anniversary of the discovery of the electron spin (own angular momentum) in the famous experiment of Stern and Gerlach from 1922. Thus, the work shows an optical analogy of two fundamental experiments in mechanics quantum - Young's and Stern-Gerlach experiments.