Ultrafast swithing perovskite material by Thz pulses

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The ability of ferroelectrics being between two bit states is at the the basis of modern data storage technology. Ferroics exhibit also (electro-) magneto-optical effects with high conversion coefficient, which ensures their effective use as modulators of optical radiation.However, when modulating the optical properties of a ferroic using an electric circuit or electromagnet the switching speed is usually limited to nanoseconds, which corresponding to frequencies on the order of units of gigahertz. Problems with interfaces and electric circuits even increase this time. The search for a conceptually new way of controlling the position of domains in less time is a new problem in fundamental studies of condensed matter. Here we present the results of the strong sub-picosecond single THz pulse action on some ferroelectric materials with the perovskite structure. It was shown by piezoresponse force microscopy that the ferroelectric polarization state differs significantly before and after the THz pulse action. We observed changes in both the amplitude and the phase of the piezoelectric response. Therefore, we conclude that a strong single THz pulse can affect ferroelectric polarization in an ultrafast time range.This work was supported by the Russian Science Foundation (grant No. 20-72-10178).This work is supported by the Ministry of Science and Education of RF (Project No. 075-15-2022-1131)