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A new non-destructive readout by using photo-recovered surface potential contrast

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Ferroelectric random access memory is still challenging in the feature of combination of room temperature stability, non-destructive readout and high intensity storage. As a non-contact and non-destructive information readout method, surface potential has never been paid enough attention because of the unavoidable decay of the surface potential contrast between oppositely polarized domains. That is mainly due to the recombination of the surface movable charges around the domain walls. Here, by introducing a laser beam into the combination of piezoresponse force microscopy and Kelvin probe force microscopy, we demonstrate that the surface potential contrast of BiFeO₃ films can be recovered under light illumination. The recovering mechanism is understood based on the redistribution of the photo-induced charges driven by the internal electric field. Furthermore, we have created a 12-cell memory pattern based on BiFeO₃ films to show the feasibility of such photo-assisted non-volatile and non-destructive readout of the ferroelectric memory.

Biography

Kui-juan Jin received her PhD degree at the Institute of Physics, CAS in 1995. She spent two years as a Postdoctoral Research Associate at the University of Tennessee/Oak Ridge National Laboratory in US. She has been Director of Optical Physics Key Lab of CAS since 2009. She was elected as a Fellow of The Institute of Physics (IOP) in 2011 and as a Fellow of The American Physical Society (APS) in 2012. She has published more than 180 research papers in SCI Journals.

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