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Ultrafast photostriction in $BiFeO_3$ thin films L.Y. CHEN, C.W. LUO, Department of Electrophysics, National Chiao Tung University, Hsinchu 300, Taiwan, Y.H. CHU, Department of Materials Science and Engineering, National Chiao Tung University, Hsinchu 300, Taiwan, T. KOBAYASHI, Department of Electrophysics, National Chiao Tung University, Hsinchu 300, Taiwan — The ultrafast dynamics of $BiFeO_3$ (BFO) thin films was studied by dual-color transient reflectivity measurements ($\Delta R/R$) from 80 K to room temperature. Based on the thickness-dependent propagating time of the photoinduced strain pulse, the sound velocity along [110] direction of BFO is 4.76 km/s. Anisotropic photostriction effect in BFO generated within short time scale of 5 ps is enhanced by the optical rectification effect. Furthermore, the anomalous changes of the temperaure-dependent $\Delta R/R$ at 130 K and 210 K may reveal the spin-orbital coupling and magnetoelastic effect in BFO.

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