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**Nematicity in FeSe single crystals probed by pump-probe spectroscopy**[1] C. W. LUO, P. C. CHENG, K. H. WU, J. Y. JUANG, Department of Electrophysics, National Chiao Tung University, Hsinchu 300, Taiwan, S.-H. WANG, J.-C. CHIANG, J.-Y. LIN, Institute of Physics, National Chiao Tung University, Hsinchu 300, Taiwan, D. A. CHAREEV, Institute of Experimental Mineralogy, Chernogolovka, Moscow Region, 142432, Russia, O. S. VOLKOVA, A. N. VASILIEV, Low Temperature Physics and Superconductivity Department, Moscow State University, 119991 Moscow, Russia — The anisotropic quasiparticle dynamics in FeSe single crystals have been studied by polarized pump-probe spectroscopy. Two distinguishable relaxation components were unambiguously observed in transient reflectivity changes ($\Delta R/R$). The orientation-dependent fast component with the timescale of 0.1-1.5 ps associated with the electronic structure clearly shows two-fold symmetry, which further reveals the gap opening along $k_y$ below the temperature of structure phase transition ($T_s$) and the electronic nematicity can persist up to 200 K. For the slow component with the timescale of 8-25 ps, it is assigned to the energy relaxation through spin sub-system and also shows a two-fold symmetry below $T_s$. However, this two-fold symmetry is dramatically weakened above $T_s$ and surprisingly persists up to at least 200 K. Consequently, the high-temperature nematic fluctuations in FeSe may be driven by the order parameters which associated with both charge (orbital) and spin sub-systems.

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