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Kapitza conductance of Bi/Sapphire interface measured by time-resolved x-ray diffraction YU-MIIN SHEU, FOCUS Center and Department of Physics, University of Michigan, Ann Arbor, Michigan 48109-1040, USA, YI-JIUNN CHIEN, CTIRAD UHER, University of Michigan, MARIANO TRIGO, JIAN CHEN, SHAMBHU GHIMIRE, PULSE Institute, SLAC National Accelerator Laboratory, DONALD WALKO, EMILY PETERSON, DOHN ARMS, Argonne National Laboratory, Argonne, Illinois 60439, USA, ERIC LANDAHL, DePaul University, Department of Physics, DAVID REIS, PULSE Institute, SLAC National Accelerator Laboratory Menlo Park, and Department of Applied Physics, Stanford University, Stanford, CA 94305 USA — We measure the thermal boundary (Kapitza) conductance at the interface between single crystal thin films of bismuth and sapphire using time-resolved x-ray diffraction. Films of varying thickness (65-284 nm) are grown by molecular beam epitaxy with their c-axis perpendicular to the surface. In the measurements, an ultrafast laser pulse is used to rapidly heat the near-surface region of the film, and x-ray diffraction is used to measure the average lattice constant of the film along the c axis. By comparing the depth dependence of the temporal profile with model calculations of the thermal transport, we extract an average Kaptiza conductance of $\sim$2000$\pm$1000 W/cm^2/K. These results do not significantly vary with film thickness or excitation density below the damage threshold.

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