In-Plane Thermal Conductivity Measurement of Bulk and Thin Film Samples Using Ultrafast Laser-Based Transient Thermoreflectance by Varying Spot Sizes of Laser Beams

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Transient thermoreflectance technique using ultrafast lasers has been well adopted for measuring the thermal conductivity of both bulk and thin film materials and interface thermal conductance. However, it still remains a great challenge to use this technique to measure in-plan thermal conductivity. In this work, we demonstrate an easy and fast way to measure the in-plane thermal conductivity of bulk and thin film samples using ultrafast laser-based transient thermoreflectance method by varying spot sizes of laser beams. A comparison is made between the proposed technique with the previously reported "beam offset" method.