

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

Wei Wang<sup>S</sup>

*Mechanical Engineering, University of Colorado, Boulder, Boulder, CO, U.S.A.*

Jun Liu

*Materials Science and Engineering, University of Illinois, Urbana Champaign, Urbana, IL, U.S.A.*

Saad Jajja and Ronggui Yang<sup>C</sup>

*Mechanical Engineering, University of Colorado, Boulder, Boulder, CO, U.S.A.*

*ronggui.yang@colorado.edu*

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-plane 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.