Abstract Submitted
for the TSF14 Meeting of
The American Physical Society

Measurement of the Absorption Coefficient of Biological Materials Using Integrating Cavity Ring-Down Spectroscopy MICHAEL CONE, JOHN MASON, ELEONORA FIGUEROA, BRETT HOKR, JOEL BIXLER, Texas A&M, CHERRY CASTELLANOS, TASC Inc., JEFFERY WIGLE, United States Air Force, GARY NOOJIN, TASC Inc., BENJAMIN ROCKWELL, United States Air Force, VLADISLAV YAKOVLEV, EDWARD FRY, Texas A&M — An accurate knowledge of optical absorption coefficients for cells and their constituents is critical to the continued progression of biomedical procedures and modeling. However, the large scattering cross section associated with many biological materials presents a significant complication in accurately determining the optical properties of biological compounds through transmission-style experiments. Transmission-style experiments measure the attenuation coefficient by comparing the intensity of a light source before and after it passes through a desired medium. For highly scattering media, the light lost through scattering contributes significantly towards the attenuation coefficient. Using Integrating Ring-Down Spectroscopy (ICRDS), we are able to directly measure the absorption coefficient of any highly scattering media even in the presence of larger scattering cross sections and small absorptions. Using a fully-enclosed cylindrical cavity made from a new diffuse reflecting material, an isotropic field of illumination is created eliminating scattering losses in ring-down measurements. Our presentation discusses the technique in great deal and discusses experimental results using retinal pigment epithelium cells.

John Mason
Texas A&M

Date submitted: 26 Sep 2014 Electronic form version 1.4