

## MWP – Young Researcher Abstract 2023

<b>Project title:</b> Shining light on fiber mechanics	
<b>Author:</b> Caterina Czibula <sup>1</sup> , Manfred H. Ulz <sup>2</sup> , Kristie J. Koski <sup>3</sup> , Ulrich Hirn <sup>1</sup>	
<b>Affiliation:</b> <sup>1</sup> Institute of Bioproducts and Paper Technology, Graz University of Technology, Austria <sup>2</sup> Institute of Strength of Materials, Graz University of Technology, Austria <sup>3</sup> Department of Chemistry, University of California Davis, USA	<b>E-mail:</b> caterina.czibula@tugraz.at
<b>Abstract</b> (approx. 200 words): Single cellulosic fibers are difficult to characterize mechanically due to the complex structure, the natural variability, and the limited size of the fibers. Tensile testing is the standard technique but only assesses the mechanical properties along the longitudinal direction of the fiber with high scattering. Other contact-based techniques are tedious and limited as well. Here, Brillouin light scattering spectroscopy (BLS) as an optical, non-contact technique is applied to measure mechanical properties. Its principle is based on the interaction of laser light with acoustic phonons in the material. By probing with BLS different directions of single cellulose fibers and assuming a hexagonal crystal symmetry, the full elastic stiffness tensor is measured in non-contact and important mechanical parameters can be obtained. Since spectra in BLS are acquired in milliseconds, the tracking of material and process dynamics is possible which could lead mechanical testing of cellulosic materials into a new age.	
<b>Key words:</b> Brillouin light scattering, micromechanics, cellulose fibers	