University of Wisconsin-Milwaukee

Dept. of Physics
COLLOQUIUM

Modeling and Measurements of Network Formation and Viscoelastic Behavior of Folded Protein-Based Hydrogels

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Proteins are vital for various daily functions and are even used in creating biocompatible materials through chemical crosslinking. However, predicting the mechanical properties of these materials is challenging due to the random orientation of constituent molecules within the network. Bridging the gap between nanoscopic and macroscopic scales is essential for formulating predictable biomaterials. Through a combination of experimental methods and computational simulations, including Single Molecule Magnetic Tweezers and Steered Molecular Dynamics Simulations, we aim to understand these properties. This approach involves determining the relative stability of pulling geometries and simulating protein unfolding to create accurate models. By subjecting simulated networks to external stress, we assess their behavior compared to experimental data, ensuring realistic predictions.

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