

Active microrheology of a bulk metallic glass

Prof. Dr. Ebrahimnazhad Rahbari

School of Chemical and Biological Engineering, Seoul National University

Rheology is the science of response of a material to a deformation rate-- e.g. how much force will be generated by a system to resist the applied deformation. Any deformation will take a time to relax. How can mechanical properties of a material that will never relax, such as a metallic glass, be investigated? In this talk, I will discuss a remedy for this problem. We investigate dynamics of a singled-out probe particle driven into a bulk metallic glass-- akin to a nanoindentation test. We demonstrate that not only one can recover all properties of a metallic glass with microrheology, yet, we found many evidence that microrheology is superior to macrorheology-- the latter only provides an average response. We then use principles of critical phenomena to describe scaling of microrheological flow curves.

References:

- [1] Yu et al., Science Advances 6, eaba8766 (2020)
- [2] Madani et al., Soft Matter Advance Article 17, 5162 (2021)

