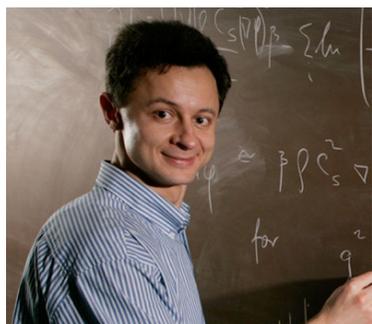

TcSUH Bi-Weekly Seminar

A Mechanism for Reversible Mesoscopic Aggregation in Liquid Solutions



Prof. Vassiliy Lubchenko

Professor, Department of Chemistry; TcSUH PI

Friday, January 10, 2020

Room 102, Houston Science Center
12:00 p.m. – 1:00 p.m.

ABSTRACT: Solutions of proteins and other molecules exhibit puzzling, mesoscopically-sized inclusions of a solute-rich liquid, well outside the region of stability of the solute-rich phase. The mesoscopic clusters are nucleation centers for a variety of solid aggregates such as fibers and crystals, and are of potential interest to synthesis of solids and textured materials, and in medicine. The clusters' mesoscopic dimensions are however in conflict with existing views on heterophase fluctuations. Here we systematically work out a microscopic mechanism by which a metastable solute-rich phase can readily nucleate in a liquid solution. A key component of the mechanism is that the solute form long-lived complexes with itself or other molecules. After nucleated in this non-classical fashion, individual droplets grow until becoming mechanically unstable because of a concomitant drop in the internal pressure, the drop caused by the metastability of the solute-rich phase. The ensemble of the droplets is steady-state. In a freshly prepared solution, the ensemble is predicted to evolve in a way similar to the conventional Ostwald ripening, during which larger droplets grow at the expense of smaller droplets.

BIO: Vassiliy Lubchenko is professor of Chemistry and Physics at UH. His research interests include the structural glass transition, inorganic solid states chemistry, and anomalous aggregation behaviors in liquid solutions. Lubchenko is a recipient of the Beckman Young Investigator Award, the Sloan Research Fellowship, and the NSF CAREER Award.

RSVP by Thursday at Noon to sbutler@uh.edu for Vietnamese sandwiches .

Persons with disabilities who require special accommodations to attend this lecture should call (713) 743-8212.
