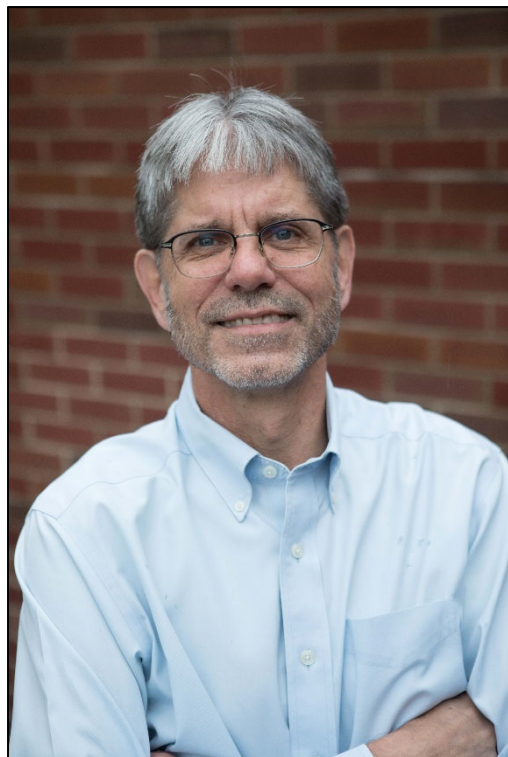


Physics & Astronomy Colloquium

Presents



Frank S. Bates

Regents Professor
Department of Chemical Engineering
and Materials Science,
University of Minnesota

Thursday, February 25, 2021
4:10 pm via Zoom

Meet the speaker at 3:30 pm, join us in welcoming the speaker and for an informal chat!

“Block Copolymer Melts Mimic Metallurgy”

Block copolymers emerged as a fascinating form of soft matter more than 50 years ago. The constraints associated with covalently linking together two or more chemically distinct polymer chains leads to nanoscale ordered morphologies. Until 10 years ago, body centered cubic (BCC) order was universally accepted as the equilibrium state associated with compositionally asymmetric, nominally spherical forming, diblock copolymers. Discovery of the Frank-Kasper σ -phase in a low molecular weight poly(isoprene)-*b*-poly(lactide) (PI-PLA) diblock copolymer in 2010 disrupted this understanding. Since then, additional Frank-Kasper phases, including A15, C14, and C15, and a dodecagonal quasicrystalline state, have been documented in a host of block copolymers and various other forms of self-assembled soft materials. Frank-Kasper phases, which are associated with tetrahedral close packing, have been recognized in many types of metal alloys since the 1950's. These periodic crystal structures are closely related to aperiodic quasicrystals, discovered in 1984. This presentation discusses the recent emergence of Frank-Kasper and quasicrystalline order in block copolymers and explores certain surprising analogies to the behavior of metal alloys.

Host: Dr. Brian Saam

Meeting ID: 957 1082 3436 • Passcode: PhysAstro