Webinar

How Glasses Relax and Go With the Flow

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All solids flow at high enough applied stress and melt at high enough temperature. Crystalline solids flow and premelt via localized particle rearrangements that occur preferentially at structural defects known as dislocations. The population of dislocations therefore controls both how crystalline solids flow and how they melt. In glasses, there is considerable evidence that localized particle rearrangements induced by stress or temperature occur at localized flow defects but attempts to identify them directly from structure alone have failed. Here I will introduce a novel application of machine learning data mining methods to diagnose flow defects, or "soft" particles from their local structural environments. We use machine learning to define a quantity, "softness," that is highly predictive of rearrangements and simplifies our understanding of dynamics considerably in super cooled liquids and glasses.

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