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**Entropy Theory of Polymer Glass-Formation in Variable Spatial Dimension.** WEN-SHENG XU, Univ of Chicago, JACK DOUGLAS, National Institute of Standards and Technology, KARL FREED, Univ of Chicago — The importance of packing frustration is broadly appreciated to be an important aspect of glass-formation. Recently, great interest has focused on using spatial dimensionality ( $d$ ) as a theoretical tool for exploring this and other aspects of glass-forming liquids. We explore glass-formation in variable  $d$  based on the generalized entropy theory, a synthesis of the Adam-Gibbs model with direct computation of the configurational entropy of polymer fluids using an established analytical statistical thermodynamic model. We find that structural relaxation in the fluid state asymptotically becomes Arrhenius in the limit and that the fluid transforms upon sufficient cooling above a critical dimension near  $d_c$  into a dense amorphous state with a finite positive residual configurational entropy. The GET also predicts the variation with  $d$  of measures of fragility and of the characteristic temperatures of glass-formation demarking the onset, middle, and end, of the broad glass transition. Direct computations of the isothermal compressibility and thermal expansion coefficient, which are physical measures of packing frustration, demonstrate that these fluid properties strongly correlate with the fragility of glass-formation. Back to three dimensions, we deduce apparently universal relationships between  $d_c$ , a measure of the breadth of the glass-formation and both the isothermal compressibility and thermal expansion coefficient of polymer melts at  $d_c$ .

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