Understanding the Viscous Behavior of Complex Polar Fluids in an External Field

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In a maximum of 1 page briefly summarize the content of your work starting with a short introduction to the topic and finalizing with a summary of results. This is a simple abstract and not an extended abstract, therefore no figures or references are needed.

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Keywords: Transport Properties, Molecular Modeling, Viscosity

Dipolar fluids are becoming increasingly important as the lubrication industry aims to develop non-oil based lubrication systems. Understanding the viscous properties of such fluids is an important step towards that goal. Using numerical and analytical tools, we study the anisotropic viscous response of a dipolar fluids in the presence of an external electric field. The fluids are simulated using molecular dynamics. We find that the presence of a strong field enhances and aligns clustering and chain formation in a way that breaks symmetry in the fluid. Because the momentum transferred through collisions will depend on the geometry of collisions, the observed viscosity of the fluid will depend on the strength and direction of the field relative to shearing.

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