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An Interactive Data Source for Combining Experiment and Theory in Polymer Rheology

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Abstract:

New interactive computer tools have the potential of integrating experimental results and theoretical predictions for a wide community of materials scientists and engineers. We believe that, eventually, seemingly disparate theories and experimental observations will be linked and taken to their limits, thereby leading to unexpected insights and new questions. This will give further insight into molecular dynamics phenomena and will allow exploration of new ideas for the development of novel polymeric materials. In the new approach, diverse data from many laboratories get standardized and compiled into a systematic data base. In addition, these experimental data merge seamlessly with theoretical predictions of polymer dynamics, both to be shown jointly in a single graph. When opening a specific rheological data set, the corresponding theory opens along with the data. Such Cyber Infrastructure Data Source (CIFS) utilizes a platform operating system (<http://rheology.tripod.com/ARC.pdf>) that is able to connect a wide range of dedicated software modules that were written by leading experts in rheology. These CIFS modules perform calculations and return the corresponding results to a central graphics screen.