

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Fingerprinting the Non-linear Response of Three Arm Star Polystyrene by Mechanical Spectral Hole Burning, Lissajous-Bowditch Loops, and Fourier Transform Rheology¹ ZHIYUAN QIAN, GREGORY B. MCKENNA², Texas Tech Univ — It is well known that large amplitude oscillatory shear (LAOS) has become a powerful tool to fingerprint the nonlinear response of polymers and other complex fluids. In a recent work, Nabila and McKenna [J. Rheol. 58(1), 43-62, 2014] used the mechanical spectral hole burning (MSHB) which was developed in our labs, along with Lissajous-Bowditch (LB) curves and Fourier transform rheology (FTR) methods to characterize the nonlinearity of linear polystyrene solutions. They observed a linear relationship between the horizontal hole intensity and the square of pump strain amplitude. The similar quadratic dependence was found for the third harmonics from FTR. However, the origins are not same for these two signatures. In the current work, the nonlinearity of polymers with more complicated molecular structure, such as three arm star polystyrene, will be studied by these three methods. The concentration dependence of the fingerprinting will also be discussed.

¹The authors are thankful to the American Chemical Society, Petroleum Research Fund 53205-ND7, for the support of this project.

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Date submitted: 10 Nov 2014

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