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UV-convergent One-loop Theory of Homogeneous Diblock Copolymer Melts JIAN QIN, PIOTR GRZYWACZ, DAVID MORSE, Department of Chemical Engineering and Materials Science, University of Minnesota — A renormalized one-loop theory is used to analyze collective and single chain correlations in the disordered phase of diblock copolymer melts. For chains with intermediate lengths ($\bar{N} \sim 1000$), the deviation of the scattering intensity from predictions of the random phase approximation is found to be significant even far away from the mean field MST. The decrease in the wavenumber $q^\star$ at which the scattering intensity is the maximum is shown to be a result of inter-molecular correlations, which leads to wavenumber dependent apparent χ parameter, and to be unrelated to fluctuation-induced changes in single-chain correlations. The relationship to the Fredrickson-Helfand-Barrat theory is discussed.

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