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Local aging effects in glassy polymers probed by 1/f noise
KONESWARAN SINNATHAMBY, NATHAN ISRAELOFF, Northeastern University — Local aging effects in glassy system have been investigated by nanometer scale probing of polarization noise fluctuations in a glassy polymer polyvinyl-acetate (PVAc) near to the primary relaxation region. Using ultra high vacuum (UHV) capacitance scanning probe microscopy (SPM) techniques, nanometer scale polarization fluctuations were probed. Time dependent changes in the noise spectrum, and high order statistical variations of the noise time series were studied and analyzed with varying temperature. Local aging was studied by analyzing the variance of the noise spectrum following a temperature quench. The temperature dependent variance is larger than the expectations of Gaussian noise, and this effect decreases with aging. Moreover, the experimental 1/f noise and computer simulations of noise from a simple model were compared in order to better understand the cooperativity and heterogeneity found in glassy polymers.

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