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Electro-Optic Search for Critical Divergence of the Charge-Density-Wave Diffusion Constant at the Onset of Depinning in Blue Bronze[1] J.W. BRILL, L. LADINO, E.G. BITTLE, M. UDDIN, University of Kentucky — We have used electro-reflectance measurements to study charge-density-wave (CDW) polarization dynamics at voltages near the CDW depinning onset (V_{on}) in the quasi-one-dimensional conductor blue bronze. For low voltages, where the phase-slip rate is low, it is expected that the polarization relaxation time should be inversely proportional to the CDW diffusion constant, which is expected to diverge at V_{on}. At T = 78 K, we observe saturation of the relaxation time at low voltages, suggesting that we are in this low phase-slip, "elastic" limit and allowing us to estimate the non-critical value of the CDW diffusion constant $D(\infty) \sim 0.02 cm^2/s$, consistent with the measured phason velocity. At other temperatures, the relaxation time increases with decreasing voltage even at the lowest voltages we could measure, indicating we are still dominated by phase-slip. In no case, however, do we observe the expected "critical speeding up", setting an upper limit on the critical region of $(V/V_{on} -1)_{critical} < 0.06$.

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