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Non Arrhenius creep motion of interacting vortices in high-T_c cuprate superconductors A. MAEDA, D. NAKAMURA, Dep. Basic Sci., Univ. Tokyo — Dynamics of driven vortices attracted much attention in many different fields of physics. In addition to the understanding of the dynamic phase diagram, the understanding of the elementary process of the vortex motion is crucially important. For a rather large driving force, the existence of the so-called washboard motion has been well established (Y. Togawa et al. : PRL 85 (2000) 3716.). On the other hand, very close to the critical driving force (critical current density), the Anderson-Kim creep picture has been believed for a long time, which is characterized as the Arrhenius process with the linear decrease of the potential barrier as a function of the external driving force. Quite recently, Luo and Hu proposed the possibility of the non-Arrhenius creep process for the vortex motion in Bragg glass phase, based on a numerical simulation (M. B. Luo and X. Hu, PRL98(2007) 267002.). Stimulated by this theoretical work, we performed a detailed $I-V$ study in a high-T_c cuprate, LSCO, and found (1) The creep process is non-Arrhenius like in the Bragg glass phase, (2) With increasing magnetic field, the creep process changes into the Arrhenius type one suddenly. (3) The field where the process changes roughly agrees with the Bragg-glass-Vortex glass transition, (4) Aging effect of the critical driving force also changes close to the Bragg glass - Vortex liquid boundary. These features agree well with predictions by Lou and Hu.

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