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Metal-insulator transition and superconductivity in the Mott insulator $GaTa_4Se_8$: towards a tuning of the Mott transition by electric pulses E. JANOD, C. VAJU, IMN, V. DUBOST, INSP, B. CORRAZE, IMN, T. CREN, INSP, P. MOREAU, IMN, F. DEBONTRIDDER, INSP, D. BRAITHWAITE, CEA Grenoble, D. RODITCHEV, INSP, L. CARIO, IMN, IMN TEAM, INSP TEAM, CEA GRENOBLE TEAM — We have recently discovered the existence of a non-volatile electric-pulse-induced resistive switching (EPI-RS) in the spinel Mott insulator $GaTa_4Se_8$ [1]. The origin of this effect is different from other EPI-RS mechanisms identified to date [2]. A granular superconducting state below T_C = 5-7 K, ascertained by critical current and critical field data obtained on single crystals, appears in the EPI "metallic" state. This transition is reminiscent of the bulk superconductivity at 5-8 K obtained under pressure [3]. Interestingly, STM experiments have revealed a puzzling electromechanical coupling between the tip voltage and the $GaTa_4Se_8$ sample surface. All these results may therefore indicate that, beside electronic doping and pressure, electric pulses, through an electrostrictive effect, could be a relevant parameter to tune the Mott metal-insulator transition. [1] C. Vaju *et al.*, Adv. Mater. 20, 2760 (2008) [2] R. Waser, M. Aono, Nature Mat. 6, 833 (2007) [3] M.M. Abd-Elmeguid *et al.*, PRL 93, 126403 (2004)

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