

Abstract

This thesis is focused on a detailed investigation of the optically induced quench switching effect in different films of antiferromagnetic CuMnAs. The quench switching effect was recently discovered to be highly reproducible resistance switching, which can be excited by electrical and optical laser pulses. This thesis compares the amplitude response to laser-induced quench switching for samples on the different substrate material, samples with different stoichiometries, and samples with different thicknesses of CuMnAs film. The effects of different ratios between the laser spot and the size of the measured device are investigated, and position-dependent measurements are also presented. It is shown that resistivity change with optical excitation using a single 120 femtosecond laser pulse can, in ideal conditions, reach up to 15% at room temperature, which is comparable with the maximum signal obtained with electrical pulses. All of the measurements combined with current knowledge of quench switching illustrate the robust behavior of this mechanism across a wide range of conditions.