

# Correlated electrons as the source of cross-correlation functions

Yoshinori TOKURA

Department of Applied Physics, University of Tokyo, Tokyo 113-8656, Japan  
Cross-Correlated Materials Research Group (CMRG), RIKEN, Wako 351-0198, Japan  
ERATO Multiferroics Project, JST, c/o University of Tokyo, Tokyo 113-8656, Japan

The cross-correlation phenomena, which bridge over the off-diagonal stimuli-responses among magnetic, electric, photonic, and thermal sectors, may host important electronic functions in future electronic devices toward high-density, high-speed, and low-energy-consumption. The gigantic magneto-resistance and electro-resistance, for example, are prospective candidates for memory/logic device functions. Here, the possible application of correlated electrons in complex transition-metal oxides and their interfaces is argued in the light of the exploratory electronic cross-correlations.