Phase Transition Properties of a Ferroelectric Superlattice with Surface Modification

Hong-Li Guo[a], Xiao-Yu Kuang[a, b], Xiong Yang[a], and Rui-Peng Chai[a]

[a] Institute of Atomic and Molecular Physics, Sichuan University, Chengdu 610065, China
[b] International Centre for Materials Physics, Academia Sinica, Shenyang 110016, China

Reprint requests to X.-Y. K.; E-mail: scu_kxy@163.com

The phase diagrams of a ferroelectric superlattice with finite alternating layers are investigated by using the transverse Ising model within the mean-field approximation. The effects of surface modification are introduced through a surface exchange interaction constant and a surface transverse field parameter. The results indicate that the features of the phase diagrams can be greatly modified by changing the transverse Ising model parameters. In addition, the crossover features of the inside transverse field parameters from the ferroelectric dominant phase diagram to the paraelectric dominant phase diagram are determined for a finite alternating superlattice.