

Abstract Submitted  
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**Giant Thermo-Power Enhancement in Multilayered Superlattices** A.M. BRATKOVSKY, Hewlett-Packard Laboratories, A.S. ALEXANDROV, Loughborough U, United Kingdom — We have developed a theory of polaron crossover from 3D to 2D and applied it to superlattices with heavily doped layers, like Nb:STO. In the crossover region the polaron energy spectrum is quantized into subbands with their subband binding energy and polaron mass essentially depending on the size of the confinement layer, when the thickness of the layer is comparable or less than the Fröhlich polaron radius. We have shown that this condition is satisfied in Nb:SrTiO<sub>3</sub>/SrTiO<sub>3</sub> superlattices and proposed a detailed explanation of the giant thermopower enhancement observed in these structures [1,2]. The theory predicts a giant confinement enhancement of the figure of merit in those polaronic MQWs where the scattering of polarons is dominated by impurities.

[1] H. Ohta, S. Kim, Y. Mune, T. Mizoguchi, K. Nomura, S. Ohta, T. Nomura, Y. Nakanishi, Y. Ikuhara, M. Hirano, H. Hosono, and K. Koumoto, *Nature Mat.* 6, 129 (2007).

[2] W. S. Choi, H. Ohta, S. J. Moon, Y. S. Lee, and T. W. Noh, arXiv:0906.5391.

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