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Collective Excitations in Cylindrical Quantum Dots Chains JIMENA VERGARA, ANGELA CAMACHO, Universidad de los Andes — We are interested in the study of collective excitations in quantum dot chains because these can be used to effectively transmit information at nano scale and to control spontaneous and stimulate electromagnetic emission in the quantum dots. [1] This work is centered in the study of semiconductor one-dimensional quantum dot arrays. Based on a tight-binding bandstructure calculation combined with a self consistent field approximation we obtain the dispersion relations and we analyze how the geometry of the dot affects the collective oscillation of charge and its propagation. We focus our study first on Coulomb interaction between charges as the main cause of the 1D plasmons neglecting tunneling to finally compare with the case where tunneling is allowed. We find out that Coulomb interaction plays an important role in these systems and that tunneling opens the energy spectrum permitting new excitations, which are good candidates to be used in nanometric devices. [1] A.V.Akimov, A.Mukherjee, C.L. Yu, D.E Chang, A.S.Zybrov, P.R. Hemmer, H Park and M.D Lukin, *Generation of Single optical plasmons in metallic nanowires coupled to quantum dots*, Nature 450, 402 (2007).

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