Bipolaron in the t-J Model Coupled to Longitudinal and Transverse Quantum Lattice Vibrations JANEZ BONCA, J. Stefan Institute, 1000 Ljubljana and FMF, University of Ljubljana, 1000 Ljubljana, Slovenia, LEV VIDMAR, J. Stefan Institute, 1000 Ljubljana, Slovenia, SADAMICHI MAEKAWA, Institute for Materials Research, Tohoku University, Sendai 980-8577, Japan, TAKAMI TOHYAMA, Yukawa Institute for Theoretical Physics, Kyoto University, Kyoto 606-8502, Japan — We explore the influence of two different polarizations of quantum oxygen vibrations on the spacial symmetry of the bound magnetic bipolaron in the context of the $t-J$ model by using exact diagonalization within a limited functional space. Linear as well as quadratic electron phonon coupling to transverse polarization stabilize $d-$wave symmetry. The existence of a magnetic background is essential for the formation of a $d-$wave bipolaron state. With increasing linear electron phonon coupling to longitudinal polarization the symmetry of a d-wave bipolaron state changes to a p-wave. Bipolaron develops a large anisotropic effective mass.

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