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Identifying the origin of Superconducting pairing in the QCP vicinity by scaling analysis of dynamical cluster quantum Monte Carlo simulation data SHI-QUAN SU, PETER REIS, HERBERT FOTSO, ZHAOXIN XU, KHATAMI EHSAN, KARLIS MIKELSONS, SHUXIANG YANG, DIMITRIS GALANAKIS, JUANA MORENO, MARK JARRELL, Physics and Astronomy Department Louisiana State University — In the phase diagram of 2D Hubbard model describing the physics of high temperature superconductor, the superconducting dome at the vicinity of the quantum critical point (QCP) persist the scaling properties similar with the case exactly on the QCP A simple phenomenological scaling theory proposed by Jan Zaanen et al. (arXiv:0905.1225v2) suggests that in the proximity of the superconducting dome the QCP generates a condition whereby in its vicinity, any weak retarded interaction will generate pairing i.e., the pairing fluctuations near the QCP are relevant. To test this hypothesis in the strong correlated many-body system, 2D Hubbard model, which beyonds the capability of perturbation type theoretical study, we will calculate the dressed single-particle Green's function bubble d-wave projected dynamic pair susceptibility within the framework of Dynamical Cluster Quantum Monte Carlo (DCA) simulation and Maximum Entropy Method (MEM), and inspect its frequency and temperature dependence to identify different susceptibility channels in the system are relevant or not.

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