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Short-Range Correlation Induced Pseudogap in Strongly Correlated Systems BUMSOO KYUNG, SARMA KANCHARLA, DAVID SENECHAL, ANDRE-MARIE TREMBLAY, University of Sherbrooke, MARCELLO CIVELLI, GABRIEL KOTLIAR, Rutgers University, UNIVERSITY OF SHERBROOKE TEAM, RUTGERS UNIVERSITY TEAM — We investigate the correlation-driven Mott transition as well as the evolution of the Mott-Hubbard insulator into a correlated metal upon doping in the 2D Hubbard model by means of the Cellular Dynamical Mean Field Theory (CDMFT). By comparing the solutions with and without antiferromagnetic long-range order, it is found that at intermediate to strong coupling the dominant physics is well captured by short range spin correlations in the normal state. These short range spin correlations create two 'additional' bands apart from the familiar lower and upper Hubbard bands in the single particle spectrum. Even a tiny doping into the Mott-Hubbard insulator causes dramatic effects - a jump of the Fermi energy to one of these additional bands and an immediate suppression of the spectral weight in the region that is now at the Fermi energy. This suggests a mechanism for the pseudogap phenomenon observed in the normal state of several cuprates.

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