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Band Insulators and Hubbard interactions GUN SANG JEON, Department of Physics, Ewha Womans University, ARA GO, Department of Physics and Astronomy and Center for Theoretical Physics, Seoul National University — We investigate the theoretical models which are band insulators in the absence of interaction and evolve into Mott insulators under strong mutual repulsive interaction. We use the cellular dynamical mean-field theory to study the nature of the interaction-driven transitions in the systems. In various systems we compute the renormalized band gap which is defined by the self-energy corrected band gap and show that it is a convenient measure to characterize band insulating phases in such systems; the spectral gap is fully explained by the renormalized band gap when the systems remain in the band insulating phase. Finally we discuss interesting transition behavior from a band insulator to a Mott insulator.

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