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Monte Carlo Summation Technique WENDUO ZHOU, University of Georgia, Department of Physics and Astronomy, R. ROBINSON, University of Georgia, Department of Computer Science, B. SCHÜTTLER, University of Georgia, Department of Physics and Astronomy, Athens, GA 30602 — The extended Hubbard model is a frequently used model to describe strongly correlated electron systems. The Green's function of this model can be calculated by perturbation theory associated with Feynman diagrams. In order to fully understand this model, larger lattices and perturbation expansions to higher order are essential. However, the current computing power limits both the sizes of physical systems and the maximum orders of perturbation expansions by brute force summation. In order to overcome this obstacle, we have developed a novel technique to do the summation by a Monte Carlo algorithm. We have applied this technique to the 2-D extended Hubbard Model in momentum space, and computed its Green's function $G(k)$ and self-energy $\Sigma(k)$ by a *self-consistent* algorithm, combined with the corresponding *irreducible* Feynman diagrams. Results for the (nearly) half-filled band case close to the Mott-Hubbard transition will be discussed.

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Wenduo Zhou
University of Georgia

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