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Numerical investigations of frustrated itinerant electrons[1]
MATTHEW ENJALRAN, Southern CT State University — Frustration has been a major topic in the study of magnetism for decades. Its presence in material systems is linked to the realization of exotic phases of matter - spin glasses, spin ices, spin liquids. With the recent discovery of several geometrically frustrated itinerant electron materials, where the relevant physics occurs on a lattice constructed from connected triangles, the role of frustration in interacting Fermi systems has become an increasingly important question. Numerical methods have been indispensable in the development of our understanding of frustrated magnets. The same will certainly hold for the study of frustrated itinerant electrons. From this perspective, we use several numerical techniques to study the frustrated Hubbard model. Our initial concerns are to explore the general physics of the frustrated Hubbard model at half-filling and to test the effectiveness of different numerical techniques in the presence of frustrating interactions. Particular emphasis is placed on the application of the constrained path/phase quantum Monte Carlo method to the frustrated Hubbard model.

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