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Effective bond theory for frustrated magnets

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Frustrated magnets are a class of materials where competing interactions between magnetic moments leads to complex behavior. As this complex behavior emerges from relatively simple rules, studying these materials can give us insight into how competing interactions can lead to the plethora of phenomena we see in strongly correlated materials, as well as insight into the nature of magnetic materials more generally. On the theoretical side, however, these materials present a number of challenges, and are usually treated with numerical methods like Monte Carlo, which are computationally inefficient, especially when considering large systems. Here, I will describe how certain materials can be treated with another method, the so-called Nematic Bond Theory, which is much more computationally efficient. I will describe this method, and show how it allows us to quickly compute observables like heat capacities and critical temperatures, even in systems with long-range interactions where considering large systems is required.

Field of study

Quantum Physics

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