Abstract Submitted
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Classical and quantum dimers on the star lattice[1] JOHN FJAERESTAD, University of Queensland, Dept of Physics — We show that dimer coverings on the star lattice (aka the 3-12, Fisher, expanded kagome or triangle-honeycomb lattice) have Z_2 arrow and pseudo-spin representations analogous to those for the kagome lattice, and use these to construct an exactly solvable quantum dimer model (QDM) with a Rokhsar-Kivelson (RK) ground state. This QDM, first discussed by Moessner and Sondhi from a different point of view, is the star-lattice analogue of a kagome-lattice QDM analyzed by Misguich et al. We discuss various properties of the classical equal-weight dimer model on the star lattice, most of which are related to those of the RK state. Using both the arrow representation and the fermionic path integral formulation of the Pfaffian method, we calculate the number of dimer coverings, dimer occupation probabilities, and dimer, vison, and monomer correlation functions. The results show unusual features similar to those of dimers on the kagome lattice. We also discuss some generalizations to general Fisher lattices and their "reduced" lattices (the kagome, squagome, and triangular-kagome lattice being examples of the latter). Ref.: J. O. Fjaerestad, arXiv:0811.3789

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