Constructing parent Hamiltonians for SU(N) ALKT states - a diagrammatic method ABHISHEK ROY, THOMAS QUELLA, Institute of Theoretical Physics, University of Cologne — Over the last decade, there has been increasing experimental interest in alkaline cold atom systems which exhibit $SU(N)$ symmmetry. Theoretical work has shown that a one-dimensional $SU(N)$ chain can have $N-1$ symmetric protected states distinguished by fractionalized boundary spins. We introduce a new method for constructing $SU(N)$ invariant Hamiltonians for Haldane phases in one dimension. Working at the AKLT point where the ground state is known exactly, we show a universal form of the Hamiltonian for any appropriate choice of physical and boundary spins. We apply our method to the case where the physical spin is in the adjoint representation and obtain a general expression for the Hamiltonian as well the Transfer Matrix for any N. Finally we comment on the relevance of our results to the generalized Haldane conjecture.

Abhishek Roy
Institute of Theoretical Physics, University of Cologne

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