On the onset of incommensurate behavior in the J_1-J_2-chain with an odd number of sites ANDREAS DESCHNER, ERIK S. SORENSEN, McMaster University — The anti-ferromagnetic spin-1/2-J_1-J_2-chain is one of the most researched spin-systems. For a chain with an even number of sites the ground-state is analytically known at $J_2/J_1 = 0.5$ and at $J_2/J_1 > 0.5$ spin-spin-correlations become incommensurate. Very little is known about how this incommensurability is manifested in chains with an odd number of sites. In this presentation we show results of variational calculations for J_1-J_2-chains with an odd number of sites and open boundary conditions in this incommensurate regime. The results indicate that the system becomes gapless at $J_2/J_1 \approx 0.53$. We show results for the on-site magnetization, the entanglement as well as correlation functions and discuss how the incommensurability dramatically affects them. In particular we show how the usual well defined single soliton excitation breaks up at $J_2/J_1 \approx 0.53$.

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