# Zeros of partition function and observables

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It is worth noting that observation of the Lee-Yang zeros at the experiment is not a trivial task because of difficulties one faces in realization of a system with complex parameters. In the paper [1] the possibility of direct experimental observation of Lee-Yang zeros for partition function of spin system was found on the basis of analysis of decoherence of probe spin. Direct experimental observation of Lee-Yang zeros was reported in [2].

We study a two-time correlation function for probe spin-1/2 interacting with spin system and find relation of the correlation function with partition function of spin system in complex magnetic field. We conclude that measuring of time dependence of the correlation function allows direct experimental observation of Lee-Yang zeros [3].

Also, two-time correlation functions of a system of Bose particles are studied. We find that zeros of the correlation functions are related with the Lee-Yang zeros of partition function of the system. So, the zeros can be experimentally observed [4]. A particular case of Bose particles on two levels is studied in details. The zeros of two-time correlation functions and the zeros of partition function of the system are found and analyzed.

The obtained relations of the Lee-Yang zeros with zeros of correlation functions open additional possibilities for experimental observation and studies of the Lee-Yang zeros.

References
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