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Seminar

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Going Complex

Complex numbers in physics are neither accidental nor just usefull mathematical tools, they appear in fact as fundamental in the set up of quantum theory. One can sometimes redefine, say, Quantum Field Theories as Real Field Theories and relate them to statistical mechanics systems amenable to "ab initio" analysis by well established stochastic algorithms. However, interesting physical questions such as non-equilibrium, dense matter or strong CP breaking bring back an unavoidable complex character, which in the frame of numerical simulations leads to the socalled "sign problem". Since analyses from first principles are of primordial interest in present day physics it is important to design numerical simulations for these cases and this mostly implies working in the complex plane. We shall here review some of the approaches, concentrating on the so called "Complex Langevin Method" which has been up to date the most thoroughly studied ansatz. We shall present some simple cases and then extend the discussion to the study of realistic physical problems.

Tuesday, 27.11.2018, 14:15 Uhr
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