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On the multiple thimbles decomposition for the Thirring model

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Lefschetz thimbles regularization is an elegant way to overcome the sign problem. By integrating over thimbles, where the imaginary part of the action stays constant and can be factored out, the sign problem disappears and observables of interest may be computed by Monte Carlo simulations. Still, many examples are known so far where the correct results can only be recovered by taking into account multiple thimbles; therefore one is left with the difficult task of collecting their contributions. The Thirring model is one of such examples: this theory has a rich thimble structure and it has been shown that one cannot reproduce the results of the full theory from the dominant thimble alone. Using the model as a test bench for the calculation techniques we have developed in Parma, we report preliminary results on reproducing the complete results from multiple thimbles simulations.

Primary author: Mr ZAMBELLO, Kevin (University of Parma and INFN, Gruppo Collegato di Parma)

Presenter: Mr ZAMBELLO, Kevin (University of Parma and INFN, Gruppo Collegato di Parma)

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