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Thimble regularization at work besides toy models: from Random Matrix Theory to Gauge Theories.

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Thimble regularization as a solution of the sign problem has been successfully put at work for a few toy models. Given the non trivial nature of the method (also from the algorithmic point of view) it is compelling to provide evidences that it works for realistic models.
A chiral random matrix theory has been studied in detail. The known analytical solution shows that the model is non-trivial as for the sign problem (in particular, phase quenched results can be very far away from the exact solution). This study gave us the chance to address a couple of key issues: how many thimbles contribute to the solution of a realistic problem? can one devise algorithms which are robust as for staying on the correct manifold?
The obvious step forward we are interested in are applications to gauge theories.

Primary author: Mr ERUZZI, Giovanni (University of Parma and INFN)

Co-author: Dr DI RENZO, Francesco (University of Parma and INFN)

Presenter: Mr ERUZZI, Giovanni (University of Parma and INFN)

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