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## A more powerful thimble approach to lattice field theories

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Lefschetz thimbles regularisation of (lattice) field theories was put forward as a possible solution to the sign problem. Despite elegant and conceptually simple, it has many subtleties. Two major ones have to do with most relevant issues: how can one efficiently implement importance sampling on thimbles? how many thimbles should we take into account? As for the first question, since a few years we have been working on algorithms in which one takes into account (complete) steepest ascent paths. We discuss improvements we devised, in particular with respect to the flow equation (which in this approach is the main building block). In the original formulation of thimble regularisation, a single thimble dominance hypothesis was put forward: in the thermodynamic limit, universality arguments could support a scenario in which the dominant thimble (associated to the global minimum of the action) captures the physical content of the field theory. By now we know many counterexamples and we have been pursuing multi-thimble simulations ourselves. Still, a single thimble regularisation would be the real breakthrough. We report on ongoing work aiming at a substantial reduction of the number of thimbles to be taken into account (possibly being left with one single thimble).

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