

Localization of Dirac modes in the SU(2)-Higgs model at finite temperature

György Baranka

Eötvös Loránd University
Budapest

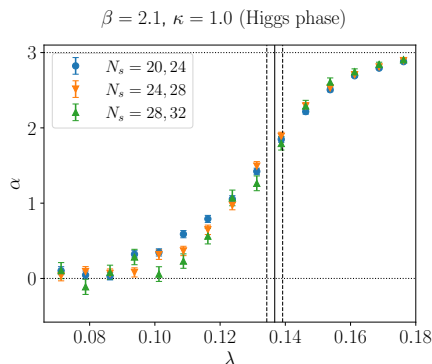
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Based on arXiv:2310.03542 (to appear in *Phys. Rev. D*)
Work done in collaboration with Matteo Giordano

- connection between deconfinement and chiral symmetry restoration in QCD is still not fully understood
- low Dirac modes could be key in understanding this connection
- chiral symmetry breaking is controlled by the density of low modes (Banks-Casher relation)
- deconfinement is signalled by the ordering of Polyakov loops
- islands of fluctuations in the sea of ordered Polyakov loops are favorable for Dirac modes \Rightarrow Dirac modes localize [Bruckmann *et al.* (2021)]
- this mechanism is general: test it in other gauge theories with a deconfinement transition \Rightarrow SU(2)-Higgs model [G. Baranka and M. Giordano (2023)]

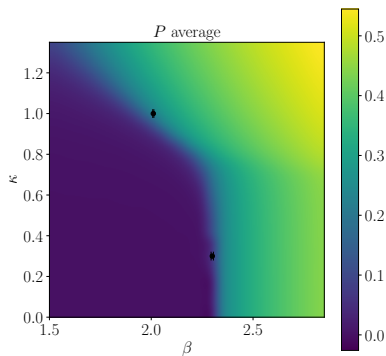
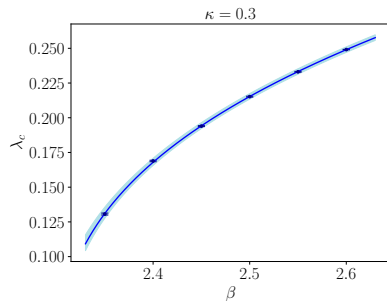
Localization in the SU(2)-Higgs model

- localized/delocalized modes occupy finite amount/fraction of volume
- mode size $\sim L^\alpha$ (α : fractal dimension)
- modes are localized up to the mobility edge λ_c



Phase diagram and localization

Localization absent in confined phase, $\lambda_c \rightarrow 0$ at the crossover



- [Bruckmann *et al.* (2021)] F. Bruckmann, T. G. Kovács, and S. Schierenberg, *Phys.Rev. D* **84**, 034505 (2011)
- [G. Baranka and M. Giordano (2023)] G. Baranka and M. Giordano, arXiv:2310.03542 (2023)