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Confinement in Schwinger model at finite temperature and θ

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The Schwinger model (QED in 1+1 dims) describes confinement and nontrivial θ vacuum similar to QCD. In this presentation, I quantitatively reveal the confining properties in the Schwinger model at finite temperature and θ using the Monte Carlo method. The well-known sign problem is avoided using bosonization, in which the Dirac fermion is transformed into a scalar boson. We observe that the string tension for noninteger probe charge becomes negative near $\theta = \pi$ at low temperatures, which can be understood by the creation of a dynamical charge pair.

Reference:
H. Ohata, "Monte Carlo study of Schwinger model without the sign problem,"
JHEP 12 (2023) 007, arXiv:2303.05481.

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