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## Tensor renormalization group approach to four-dimensional complex \phi^4 theory at finite density

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Tensor network is an attractive approach to field theory with

negative sign problem. The complex  $\phi^4$  theory at finite density is a test bed for numerical algorithms to verify their effectiveness.

The model shows a characteristic feature called the Silver Blaze phenomenon associated with the sign problem in the large volume limit at low temperature. We analyze the four-dimensional model employing the anisotropic tensor renormalization group algorithm. We find a clear signal of the Silver Blaze phenomenon on a large volume of  $V=1024^{4}$ , which implies that the tensor network approach is effective even for fourdimensional field theory beyond two dimensions.

Primary author: AKIYAMA (\*), Shinichiro (University of Tsukuba)

Co-authors: KADOH, Daisuke; KURAMASHI, Yoshinobu; YAMASHITA, Takumi; YOSHIMURA, Yusuke

Presenter: AKIYAMA (\*), Shinichiro (University of Tsukuba)

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