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Geometry and dynamics of emergent spacetime from entanglement spectrum HIROAKI MATSUEDA, Sendai National College of Technology — We examine geometry and dynamics of classical spacetime derived from entanglement spectrum for 1D lattice free fermions. The spacetime is a kind of canonical parameter space defined by the Fisher information metric. The spectrum has exponential family form like thermal probability. Then, the metric is given by the second derivative of the Hessian potential that can be identified with the entanglement entropy. We emphasize that the canonical parameters are nontrivial functions of partial system size by the truncation, filling fraction of fermions, and time. We find that the emergent geometry becomes anti-de Sitter spacetime with imaginary time, and a radial axis as well as spacetime coordinates appears spontaneously. We also find that the information of the UV limit of the original fermions lives in the boundary of the anti-de Sitter spacetime. These findings strongly suggest that the Hessian potential for free fermions has enough geometrical meaning associated with gauge-gravity correspondence.

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