Entanglement entropy and area law in many-body systems

Jaeyoon Cho (jaeyoon.cho@apctp.org)
APCTP

Understanding the nature of entanglement in strongly-correlated many-body systems is of prime importance in modern theoretical physics. In this lecture, I introduce the concept of entanglement entropies and the entanglement area law, and briefly review their implications in various topical issues. I then introduce a number of cases wherein the entanglement entropy can be analytically calculated, estimated, or bounded. In particular, I will discuss how the spectral gap, correlation functions, and the entanglement area law in strongly-correlated systems are mutually related to each other.

References

J. Eisert et al., Rev. Mod. Phys. 82, 277 (2010)
J. Cho, Phys. Rev. Lett. 113, 197204 (2014)
J. Cho, Phys. Rev. X 8, 031009 (2018)