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Emergence of kinematic space from quantum modular geometric tensor

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We generalize the Quantum Geometric Tensor by replacing a Hamiltonian with a modular Hamiltonian. The symmetric part of the Quantum Geometric Tensor provides a Fubini-Study metric, and its anti-symmetric sector gives a Berry curvature. Our generalization dubbed Quantum Modular Geometric Tensor gives the metric and curvature of a Kinematic Space. We also use the result of the identity Virasoro block to relate the connected correlator of two Wilson lines to the two-point function of a modular Hamiltonian. This relation realizes a novel holographic entanglement formula for two intervals of a general separation. This result also provides a new interpretation to the connected correlators as the mutual information. Our study remains valid at the quantum level. Hence it provides an opportunity to explore the Kinematic Space in a generic case without conformal symmetry.

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