

Abstract Submitted
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A generalization of Noether's theorem and the information-theoretic approach to the study of symmetric dynamics¹ IMAN MARVIAN, Perimeter Institute, IQC, ROBERT SPEKKENS, Perimeter Institute — Information theory provides a novel approach to study of the consequences of symmetry of dynamics which goes far beyond the traditional conservation laws and Noether's theorem. The conservation laws are not applicable to the dissipative and open systems. In fact, as we will show, even in the case of closed system dynamics if the state of system is not pure the conservation laws do not capture all the consequences of symmetry. Using information theoretic approach to this problem we introduce new quantities called asymmetry monotones, that if the system is closed they are constant of motion and otherwise, if the system is open, they are always non-increasing. We also explain how different results in quantum information theory can have non-trivial consequences about the symmetric dynamics of quantum systems.

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