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Theories of Dynamical Quantum Resources

A common theme in Chemistry, Thermodynamics, and Information Theory is how one type of resource – be it chemicals, heat baths, or communication channels – can be used to produce another. These processes of conversion and their applications are studied under the general heading of "resource theories". While resource theories use a wide range of sophisticated and apparently unrelated mathematical techniques, there is also an emerging general mathematical framework which seems to underpin all of them. In this talk, I will introduce some of these common mathematical structures that appear in resource theories, particularly those appearing in resource theories of quantum processes.