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# 【5】From discrete quasicrystalline to continuous Lie symmetries in cavity QED

*Wednesday 1 September 2021 12:00 (30 minutes)*

Symmetry and symmetry breaking play essential roles in a wide range of physical phenomena and have numerous applications, ranging from labelling energy eigenstates of atoms and molecules to effectively describing quantum phase transitions and topological classification of quantum matter. An intriguing example is the discovery of materials with crystallographically forbidden rotational symmetries known as “quasicrystals” which has changed the notion of the ordering in materials. Here in this talk, first I will show how a discrete quasicrystalline symmetry can emerge in an ultracold-atom-cavity quantum electrodynamics (QED) setup. Then I will discuss general conditions which guarantee the existence of continuous Lie symmetries in generic quantum-gas-cavity-QED systems, thus rendering a symmetry classification scheme for matter-field interaction Hamiltonians.

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