

# Roaming in the Parameter Space: Emergent Dimensions

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## **Abstract**

Some recent studies have shown that quantum mechanics can be realized geometrically. In this talk, we will briefly review some basic ideas of differential geometry (Riemannian geometry). We then move on to the question of how quantum mechanics can be understood geometrically. With these geometric tools in hand, we demonstrate how the evolution dimensions are emerged naturally from parameter space and derive the evolution equations for quantum states along the emergent dimensions. Finally, we show the similarity between quantum phase transitions and the event horizon.