

# Ultra-strong coupling regime in cavity quantum electrodynamics

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Ultrastrong coupling between light and matter has, in the past decade, transitioned from a theoretical idea to an experimental reality. It is a new regime of quantum light–matter interaction, which goes beyond weak and strong coupling to make the coupling strength comparable to the transition frequencies in the system. The achievement of weak and strong coupling has led to increased control of quantum systems and to applications such as lasers, quantum sensing, and quantum information processing. After a brief introduction to some of its basic ideas, I will describe two examples. Our works on this topic are available here: <https://dml.riken.jp/pub/Ultra-strong/> A pedagogical review on this was published a few weeks ago: Ultra-strong coupling between light and matter, *Nature Reviews Physics* 1, pp. 19–40 (2019).

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