It is expected that DSC physics could be exploited to control artificial atoms at high speed and to minimize the back action of quantum measurements, thus contributing to the progress of quantum technology.

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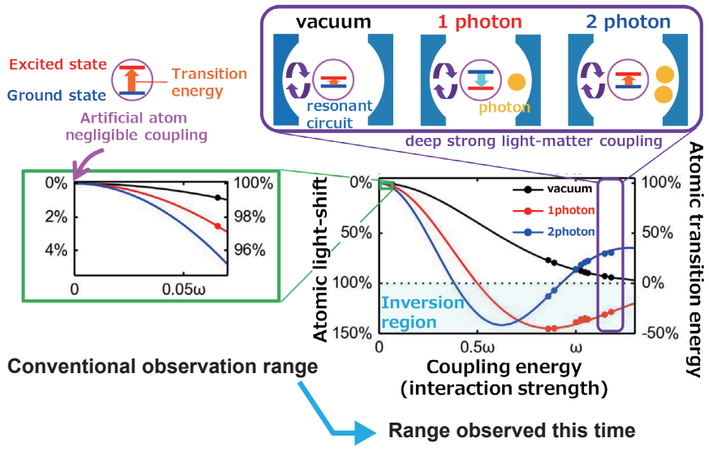

Fig.2 : Transition energy of an artificial atom with 0, 1, or 2 photons in the LC resonator circuit

Footnote

***1 Superconducting artificial atom:** A quantum circuit made from a superconductor with discrete energy levels that resemble the line spectrum of a natural atom.

Reference

Physical Review Letters
DOI: https://doi.org/10.1103/PhysRevLett.120.183601
URL: https://journals.aps.org/prl/abstract/10.1103/PhysRevLett.120.183601
Inversion of qubit energy levels in qubit-oscillator circuits in the deep-strong-coupling regime
F. Yoshihara, T. Fuse, Z. Ao, S. Ashhab, K. Kakuyanagi, S. Saito, T. Aoki, K. Koshino, and K. Semba

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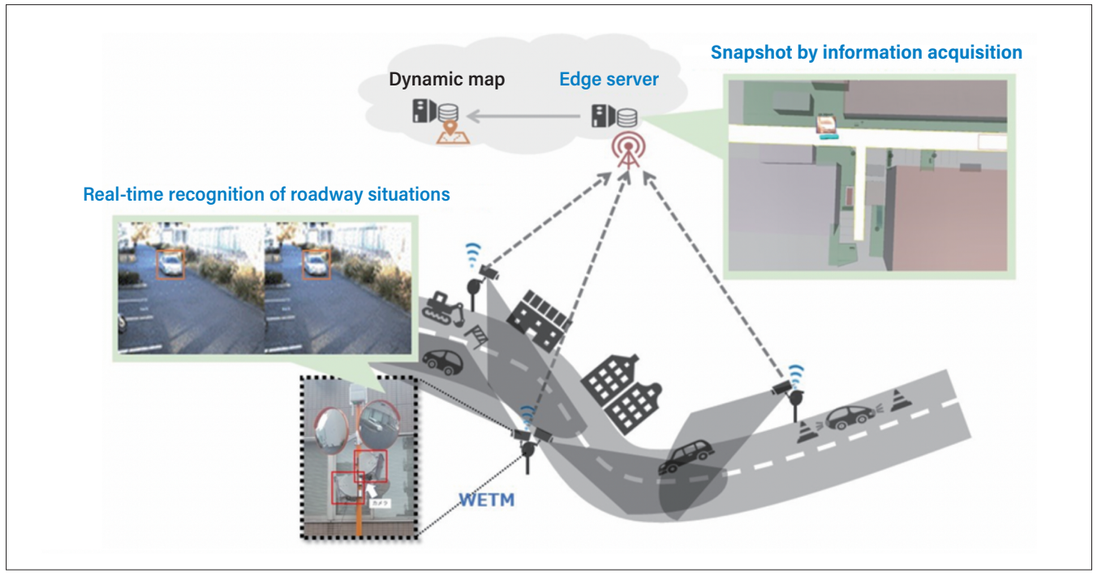
CONNECT

Toward autonomous transport infrastructure utilizing 5G ultra-low latency

Real-time recognition of roadway situations by Wireless Electronic Traffic Mirror (WETM) built-in sensors

In the near future, the diverse autonomous mobilities of vehicles, drones, tractors, etc. are expected to become more popular, and a highly reliable intelligent transport infrastructure will be required to support safe autonomous movement. In addition, various mobilities may autonomously move in different road situations with combinations of congestion, construction, potential collisions, and so on. In order to achieve an autonomous transport system, the roadway situations need to be accurately grasped in real time. This necessitates the establishment of a roadway acquisition technology by which a large number of sensors with wireless communications can collect the road information and place it on a dynamic map to maintain the road information.



An overview of intelligent transport infrastructure.

For the establishment of a roadway acquisition technology, NICT Wireless System Research Center (WSRC) researchers built a test-bed intelligent transport infrastructure in Yokosuka Research Park (YRP) utilizing the 5th generation wireless communication system (5G) ultra-low latency to support autonomous mobility in the roadway environment as in the intersections.

"Under the test-bed infrastructure, we have confirmed that it is possible to grasp the roadway situations in real time."

In addition, they developed a Wireless Electronic Traffic Mirror (WETM) built-in camera and location measuring sensors that enable the collection of information on a variety of roadway situations such as road construction and vehicle congestion. This information is then reflected on a dynamic map (DM), which is a database maintaining the roadway information, and is transmitted to the autonomously moving vehicles, pedestrians, and so on.

Kentaro Ishizu, research manager of the WSRC Wireless System Laboratory, stated, "Under the test-bed infrastructure, we have confirmed that it is possible to grasp the roadway situations in real time, especially an area in the vicinity of an intersection with poor visibility. From these achievements, we expect to construct an intelligent transport infrastructure to avoid mobility collisions and to predict movement."

In the future, they will implement the 5G wireless communication system on the test-bed infrastructure and evaluate its performance with various wireless systems in different roadway conditions such as when a large number of moving objects is located on a roadway and the moving speed of each is different or the area is wide. Dr. Ishizu also said, "We will confirm the functional requirements to be aimed at establishing the technology to realize a more advanced autonomous transport system."

An appreance of WETM