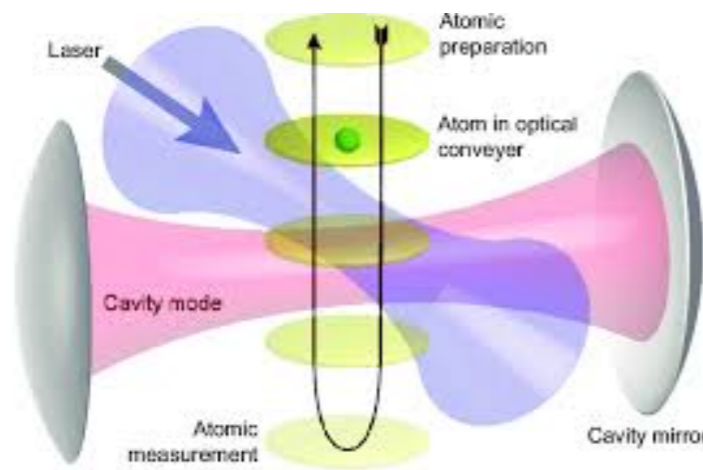


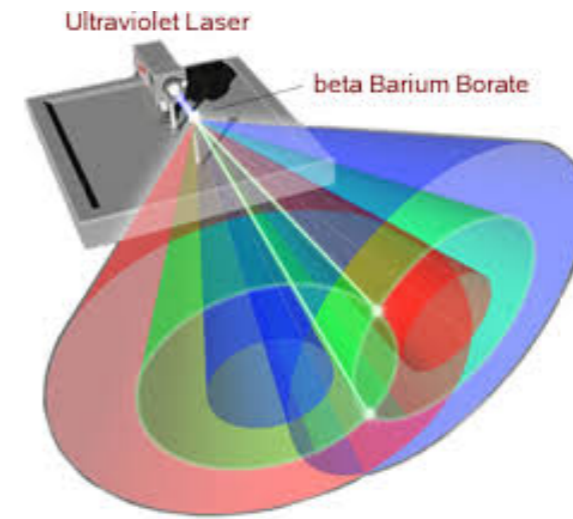
노창석 (123호)

양자 광학/정보 (quantum optics/information)

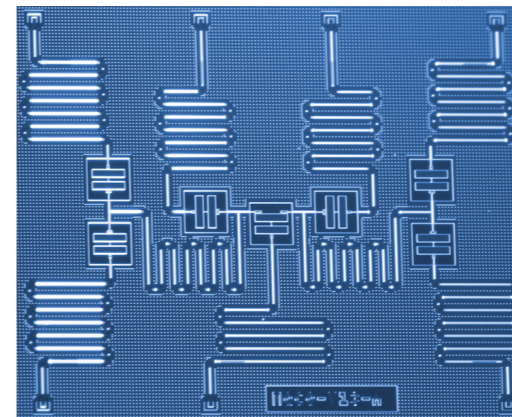
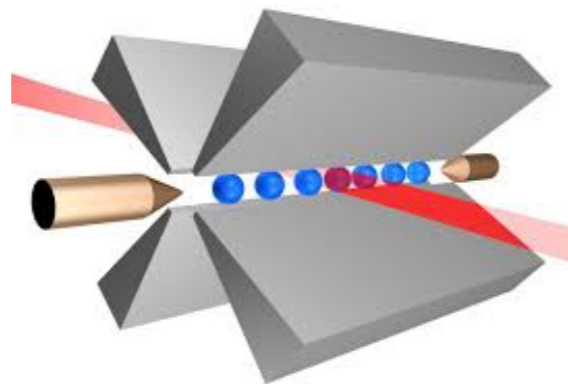
Atom-light interaction
(원자-빛 상호작용)



Entangled states of light
(빛의 양자얽힘 상태)



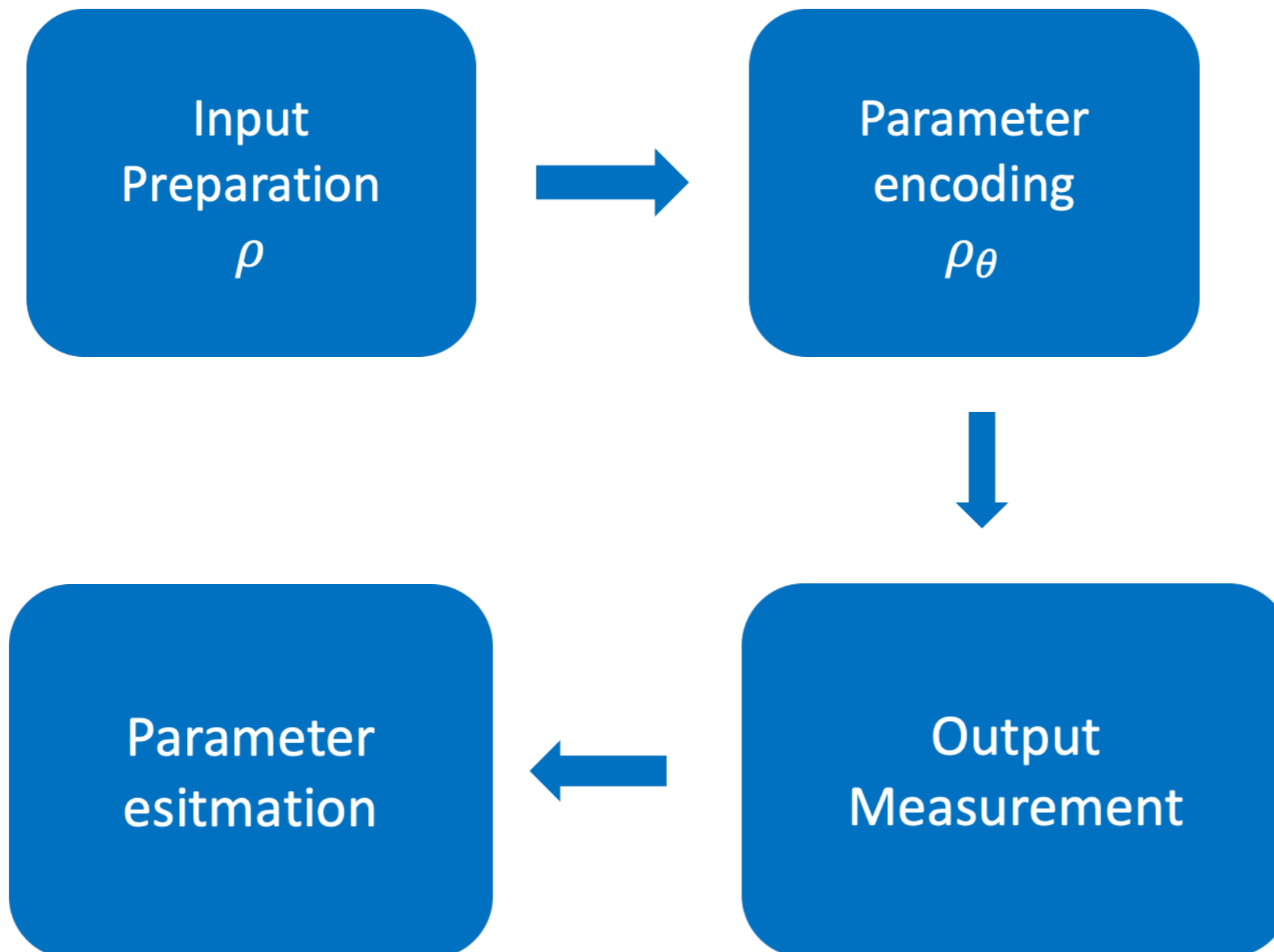
Trapped ions
(이온트랩)



Superconducting circuit
(초전도체 서킷)

Quantum metrology (양자 계측)

양자 상태를 이용하여 고전적인 방법보다 더 정확하게 모수 추정을 하는 방법



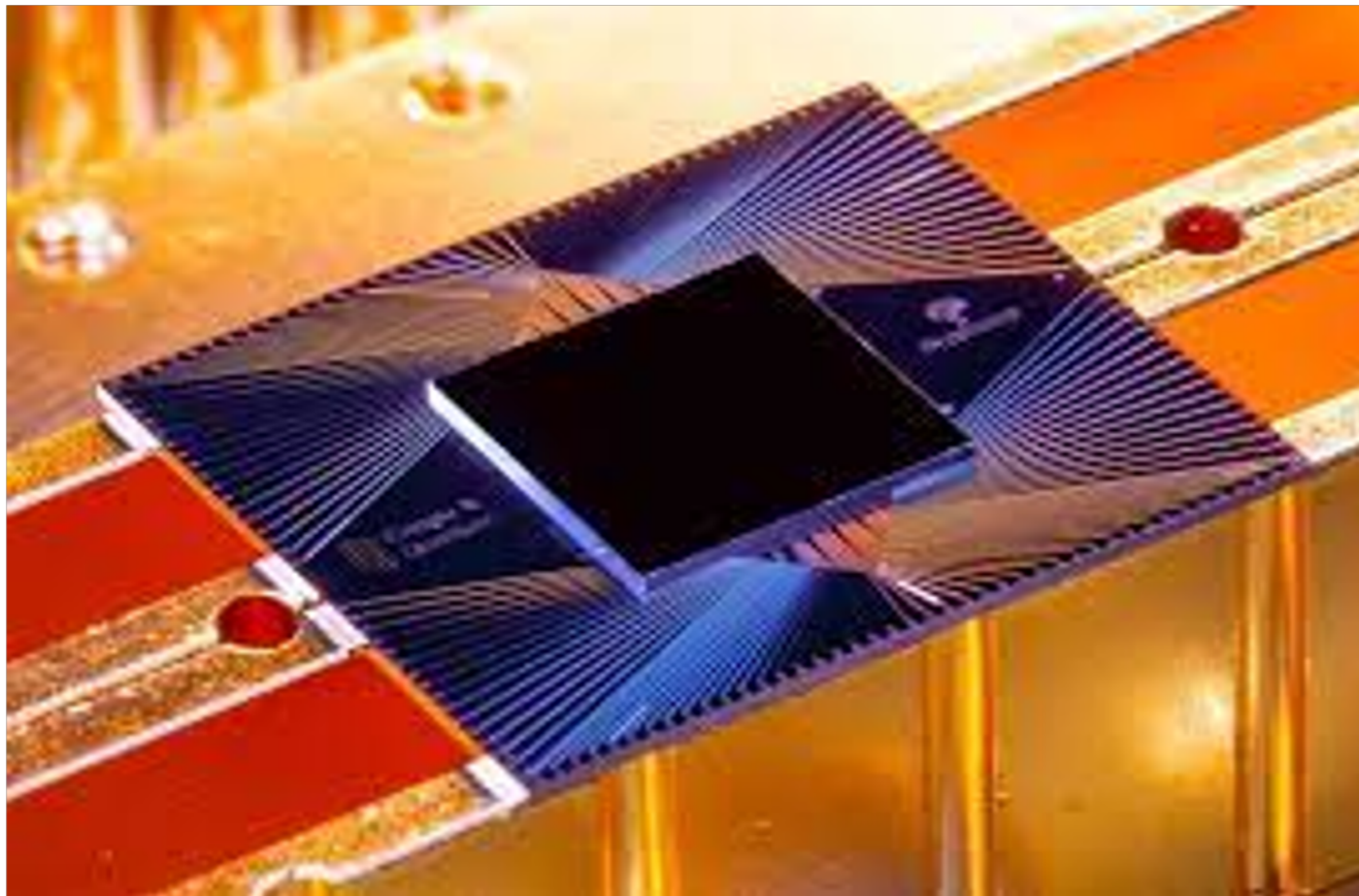
Quantum illumination (양자 조명)

양자 얽힘을 사용하여 고전적인 방법에 비해 물체 탐지의 오류를 줄이는 방법.
Quantum hypothesis testing.



Quantum computing (양자 컴퓨팅)

초전도체 회로를 이용하여 양자 컴퓨팅 구현에 필요한 요소 연구
노이즈 분석, 컨트롤 최적화, 벤치마킹 및 성능지표 방법



Quantum communication (양자 통신)

양자효과를 활용하여 정보 전송을 더 원활히 하는 방법

양자 중계기, 양자 메모리

Quantum Communications

Information can now be encoded (represented) by multi-state quantum bits (qubits)

- Entangled photons as qubits can interact with each other at any distance
- By having a satellite distribute entangled photons via optical links to well separated stations on Earth, those stations can "talk" to each other via the entangled photons - without needing to be physically connected

Benefits

- Quantum networks with space links
- Data security
- Improved energy efficiency for optical communications
- Improved bandwidth efficiency for optical communications

Quantum satellite distributing entangled photons

3m TBR Telescope

3m TBR Telescope

Cubsat(s) with Laser Beacon

Photons

Quantum connection using entangled photons (no physical connection)

Multi-node Quantum Network

Ground Station

Quantum Network

Ground Station

Quantum Network

Quantum machine learning (양자 기계학습)

1. 고전 기계학습 모형들을 활용하여 물리학 분야의 문제를 해결
2. 기계학습 구조에 양자역학의 개념을 접목하여 개선

