

# Single dopant detection

- Observation of an atom in a transistor -

## Motivation

For future nano- and quantum-electronics, we are developing technology that enables us to identify the position of individual doped atoms, or dopants, in a silicon field-effect transistor.

## Originality

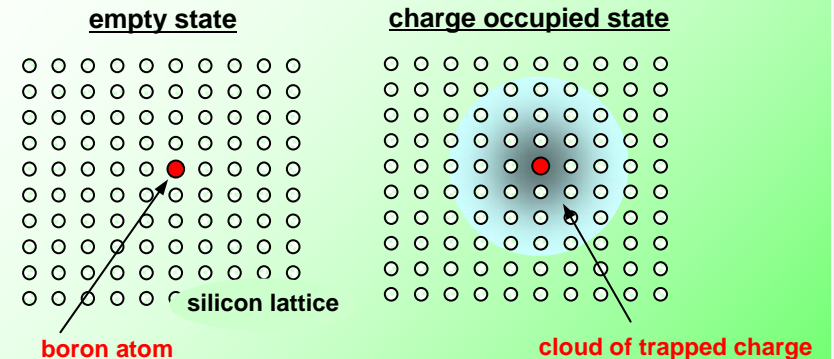
We elaborately designed the device structure for the detection of single dopants. By isolating the channel containing only up to a few dopant (boron) atoms from the heavily doped source and drain, we successfully observed the conductance characteristics governed by the single boron atom in the channel.

## Impact

The present observation is the first step towards the development of dopant-identification technology, which is one of the keys for designing future highly scaled transistors and even quantum information devices.

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## Dopant atom in silicon



## Experiments

