Terahertz-wave detectors using high-temperature superconductors

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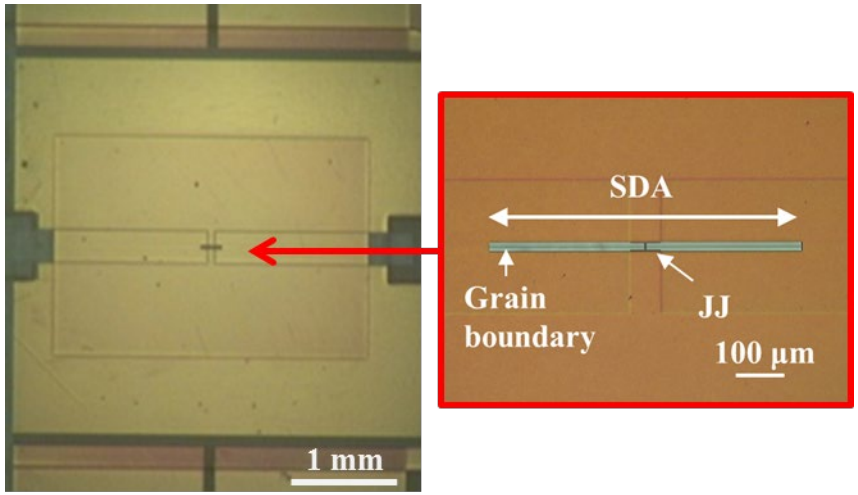
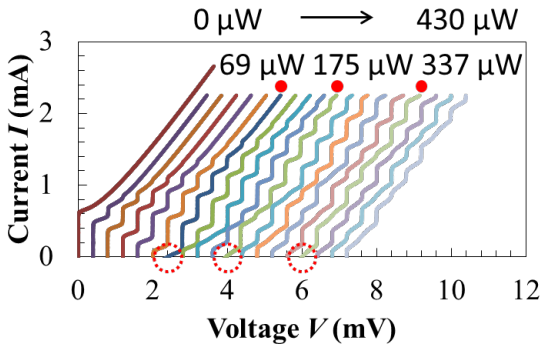
Illustration

1 wavelength SDA coupled JJ detector



Optical-microscope image



Current-Voltage characteristics

Content:

Terahertz (THz) wave is the electromagnetic wave whose frequency is around 0.1-10 THz, and is expected to be used for communicating, imaging, security, and so on. It is important for THz-wave applications to develop wideband, high-sensitive, high-speed and easy to cool detectors.

The figures show the optical-microscope images and the current-voltage (I-V) characteristics of a THz-wave detector in which a Josephson junction (JJ) is coupled with a 1 wavelength slot-dipole antenna (SDA). In the enlarged image, the part like a black bridge is the JJ, and the horizontally wide white part is a SDA, in which the substrate is shown. The figure of I-V characteristics shows characteristics for various power of THz-wave side by side. When THz-wave was irradiated to the detector, the I-V characteristics had some steps (Shapiro steps) and were varied depending on the power.

Appealing point:

I have examined THz-wave detectors using high-temperature superconductors for the spread of THz technique.

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Research Interest : Superconductivity, Measurement

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