

Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Non-linear current-voltages character of Au quantum point contact MAKOTO YOSHIDA, YOSHIFUMI OSIMA, KUNIO TAKAYANAGI, DEPARTMENT OF PHYSICS TOKYO INSTITUTE OF TECHNOLOGY TEAM — In this study, we simultaneously observed the configuration and the non-linear current-voltages character (I-V) of gold quantum point contacts (Au-QPC). UHV Transmission Electron Microscope (UHV-TEM) which combined with Scanning Tunneling Microscope (STM) enabled us to observe the configuration of QPC. TEM images were synchronized with the measured I-V. The bias voltage to Au-QPC swept from 0V to 0.3V at room temperature in UHV($\sim 1 \times 10^{-17}$ [Pa]). The Au-QPC with short length ($< \sim 1$ nm) showed the non-linear I-V which were fitted to a cubic function ($I = aV + cV^3$). The value of c/a in our results ($\sim 20 [1/V^2]$) was larger than that of previous reports ($0.3 \sim 2 [1/V^2]$). Simultaneous TEM images revealed a changed of the width of Au-QPC. The width was found to increase from 1.1 nm (0.02V) to 1.9 nm (0.27V). On the other hand, the Au-QPC with long length (nanowire $> \sim 1$ nm) showed the linear I-V, and the width was kept constant. We suggested that the changing of the width caused the non-linear I-V. The mechanism of increasing the width should be solved by further investigation.

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Date submitted: 29 Nov 2004

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