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Point contact spectroscopy of Cu-Cu nanoconstriction

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It is well known that relative polarization between two magnetic electrodes gives TMR value. In general,
for spintronics it is important that transport electron's spins are conserved through an interface
without spin-flip scattering or spin-rotation. In the case of MTJ, TMR values are different depending on the types of the insulating barrier materials such as AlOx and MgO. To understand the mechanism of pin-dependent transport at interface, small-sized nanoconstriction for point contact spectroscopy is needed.

As the first step, we are developing the method of fabricating nanoconstriction through a SiNx membrane
to check out F/N interface. Aperture diameter less than 5nm is expected to be necessay in order to
investigate the transport mechanism at metalic F/N interfaces. As a model system to check the aperture
size, we used transport spectroscopy of Cu-Cu contact. A typical Cu-Cu contact less than 5nm is supposed to be above 10-Ohm. And its R-T, I-V, dV/dI-V, dR/dI-V and effects of background thermal excitation give information about the size and cleanness of its contact. We show that our method of fabricating nanoconstriction provides a constriction less than diameter of 5 nm, exhibiting Cu phonon peaks. We will present our plan to use the nanoconstriction for F/N interface.