NANOFAB FUTURE ELECTRONICS

CNST Center for Nanoscale Science & Technology

Measurement of Current Polarization by Doppler-Shifted Spin Waves

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GOAL

To develop methods for measuring the spin polarization of current in ferromagnetic metals, which is a pivotal parameter for spin-based future electronics.

KEY ACCOMPLISHMENTS

Designed and fabricated devices to measure spin wave propagation at sub-micrometer wavelengths in current-carrying ferromagnetic metals.

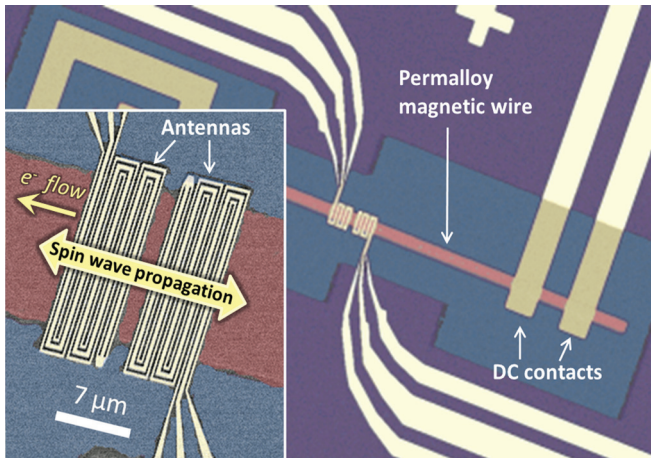
Measured current polarization in $Ni_{80}Fe_{20}$ (Permalloy) with two times the precision of existing measurements and provided the first measurements of temperature dependence in current polarization.

Measured nearly complete polarization (0.95 ± 0.05) in $(CoFe)_{0.2}Ge_{0.2}$ alloy.

KEY NANOFAB PROCESS

Electron beam lithography.

False color scanning electron micrograph of a spin wave Doppler device. The inset is an expanded view of the antennas that launch and detect spin waves.



REFERENCES

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