

## **Current perpendicular to plane single-nanowire GMR sensor**

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By electrochemical deposition in a single nanopore membrane we fabricate Cu/Co layered single nanowires, that exhibit up to 10% magnetoresistance at room temperature.

Single nanopore membranes are prepared by irradiating polycarbonate membranes with exactly one swift heavy ion, and by subsequent chemical etching of the single ion track.

Both dc and pulsed electrodeposition of single wires consisting of Cu-Co alloy and Cu/Co multilayers respectively are performed from a bath containing the two metal ions.

By sputtering a gold electrode on the upper membrane surface, the single nanowire embedded in the flexible polymer foil is reliably contacted. While alloy wires exhibit anisotropic magnetoresistance (AMR), multilayer wires display current-perpendicular-to-plane giant magnetoresistance (CPP-GMR) behavior.

This demonstrates that both the fabrication and contacting methods are very suitable for the investigation of transport properties, without the necessity of lithographic processes and without manipulation of the nanowires. In addition, the method opens up many new possibilities for single nanowire-based sensors.