

# Experimental verification of shielding effect in coplanar waveguide VNA-FMR experiments

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Broadband ferromagnetic resonance (VNA-FMR) based on coplanar waveguide was used to characterize double spin valves, which consist of three magnetic subsystems: a perpendicularly magnetized polarizer, an in-plane free layer and an in-plane pinned analyzer. Samples were prepared on different buffers: A - Ti/Au, B - (Ti/Au)x5 and C - (Ti/Au)x10. Despite the structures had the same magnetic properties (e.a., the same resonance fields of magnetic subsystems and the same magnetic moments) signal from samples on A buffer was 6-7 times higher than for samples on B and C buffer. These results can be regarded as an evidence of shielding of microwaves by a conducting film. To verify the effect of shielding, we prepared Co (2.5 nm) films on Au and Cu wedge buffers. Their sheet resistance decreases with thickness so that we can observe enhancement of FMR signal as a function of the buffer thickness. We observed that the amplitude of FMR absorption increases with thickness and saturates at approximately 40 nm gold buffer.

*This work was supported by the Polish-Swiss Research Program NANOSPIN PSRP-045/2010.*