

# Ferromagnetic resonance-induced spin pumping in CoFeB/Pd systems deposited on rigid and flexible substrates

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Broadband ferromagnetic resonance (FMR) has been used to investigate the dependence of the magnetic damping enhancement in CoFeB/Pd bilayer systems due to spin pumping. This study has been realized on a series of samples characterized by a fixed CoFeB thickness of 6 nm while the Pd thickness varies from 2 to 30 nm ( $t_{\text{Pd}} = 2, 4, 6, 8, 12, 20$  and 30 nm). This series has been simultaneously deposited on two different substrates: a rigid one (Si) and a flexible one (Kapton). The results obtained from the analysis of the FMR measurements reveal show an exponential behaviour of the Gilbert damping as function of the Pd thickness in both kind of substrate. The experimental data was analysed using an analytical model for spin pumping [1,2], which includes the effective spin mixing conductance of the CoFeB/Pd interface and the spin-diffusion length. The estimated values are around  $6 \text{ nm}^{-2}$  for both substrates whereas the diffusion length differs significantly between the two substrates (5.22 nm for Si substrate and 1.11 nm for Kapton substrate). The obtained results demonstrate the efficiency of the possibility of tuning the Gilbert damping constant by a judicious choice of the nonmagnetic film, depending on the desired application.

## References:

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*Authors would like to thank CNRS and the National University of Singapore for their support through the International Research Program (IRP) Stretch-Smart*