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Damping in Nanometer-Thick Yttrium Iron Garnet Films Capped by Platinum[1] HOUCHEN CHANG, YIYAN SUN, MICHAEL KABATEK, YOUNG-YEAL SONG, ZIHUI WANG, MICHAEL JANTZ, WILLIAM SCHNEIDER, MINGZHONG WU, Colorado State University, ERIC MONTOYA, BARTEK KARDASZ, BRET HEINRICH, Simon Fraser University, SUZANNE TE VELTHUIS, HELMUT SCHULTHEISS, AXEL HOFFMANN, Argonne National Laboratory — Damping in magnetic materials can be realized through energy redistribution within the magnetic subsystem, energy transfer to non-magnetic subsystems and to external systems via spin pumping. This presentation reports on experimental evidences for a new damping. In samples of nm-thick ferromagnetic yttrium iron garnet (YIG) films capped by Pt films, the 3 nm or thicker Pt layer produces an extra damping much larger than the expected damping from spin pumping and with a shift in the ferromagnetic resonance (FMR) field. This damping can be switched off by a Cu spacer The damping may originate from the FM ordering in the Pt atomic layers by magnetic proximity effect near the YIG/Pt interface and the dynamic exchange coupling between the ordered Pt spins and the YIG spins. The YIG-Pt coupling allows for transfer of the damping of the FM Pt to the YIG film. The presence of the FM Pt causes spin pumping from FM Pt into paramagnetic Pt instead of conventional spin pumping from YIG to Pt.

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Houchen Chang
Colorado State University

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