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Low frequency noise peak near magnon emission energy in magnetic tunnel junctions LIANG LIU, LI XIANG, HUIQIANG GUO, JIAN WEI, International Center for Quantum Materials, School of Physics, Peking University, Beijing 100871, China, DALAI LI, Z.H. YUAN, JIAFENG FENG, XIUFENG HAN, Beijing National Laboratory of Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, J.M.D. COEY, CRANN and School of Physics, Trinity College, Dublin 2, Ireland — We report on the low frequency noise in magnetic tunnel junctions (MTJs) below 4 K and at low bias, where thermal activation from the bath is suppressed and magnon emission from hot tunneling electrons dominates the transport. For one CoFeB/MgO/CoFeB MTJ, within a narrow range of bias voltage around magnon emission energy, a Lorentzian shape noise spectra is observed. For one CoFeB/AlO_x/CoFeB MTJ, at similar bias voltage but within much wide bias range, a much larger Lorentzian shape noise spectra is observed and random telegraph noise is visible in the time traces. In both cases the Lorentzian spectra eventually disappears after repeated measurements, which in combination of the fitted parameters suggests magnon-assisted activation of defects as its origin.

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