Supplementary Information: Proximity effects across oxide-interfaces of superconductor-insulator-ferromagnet hybrid heterostructure

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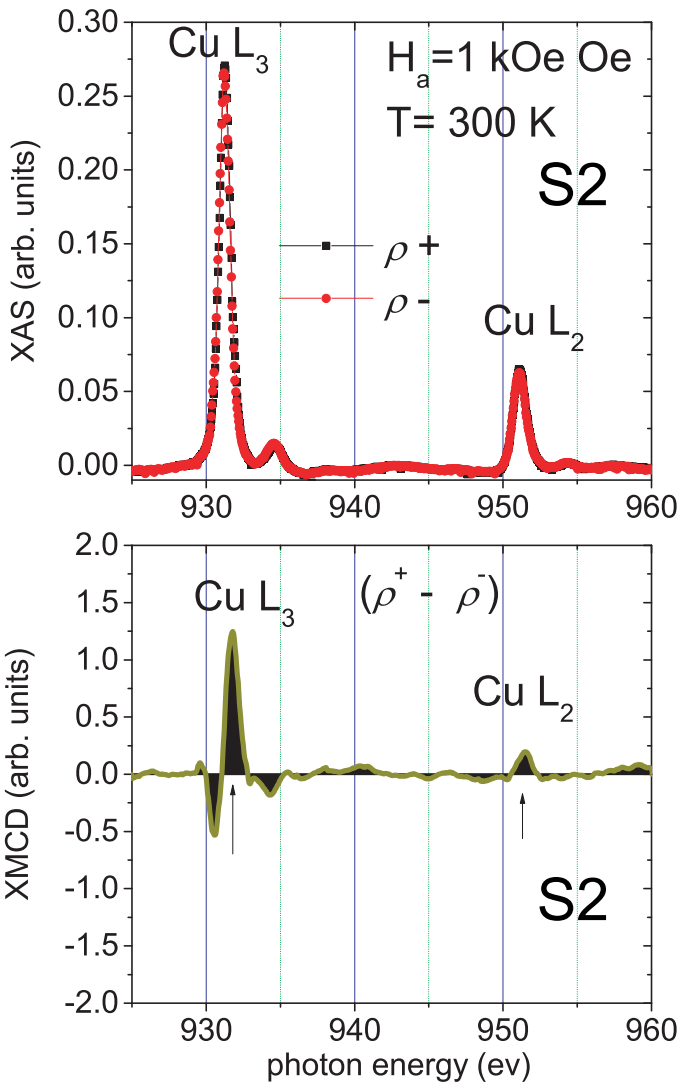

FIG. 1: (Color online) **Cu L edge XAS and XMCD spectrum of specimen S2 at 300 K.** FY XAS for the Cu $L_{3,2}$ edges with two different photon helicities (ρ^+ and ρ^-) and the corresponding XMCD measurements from the S2 ML measured at 300 K and 1 kOe. The XMCD signals have been multiplied by a factor of 10^2. The signal indicates a non-magnetic Cu.

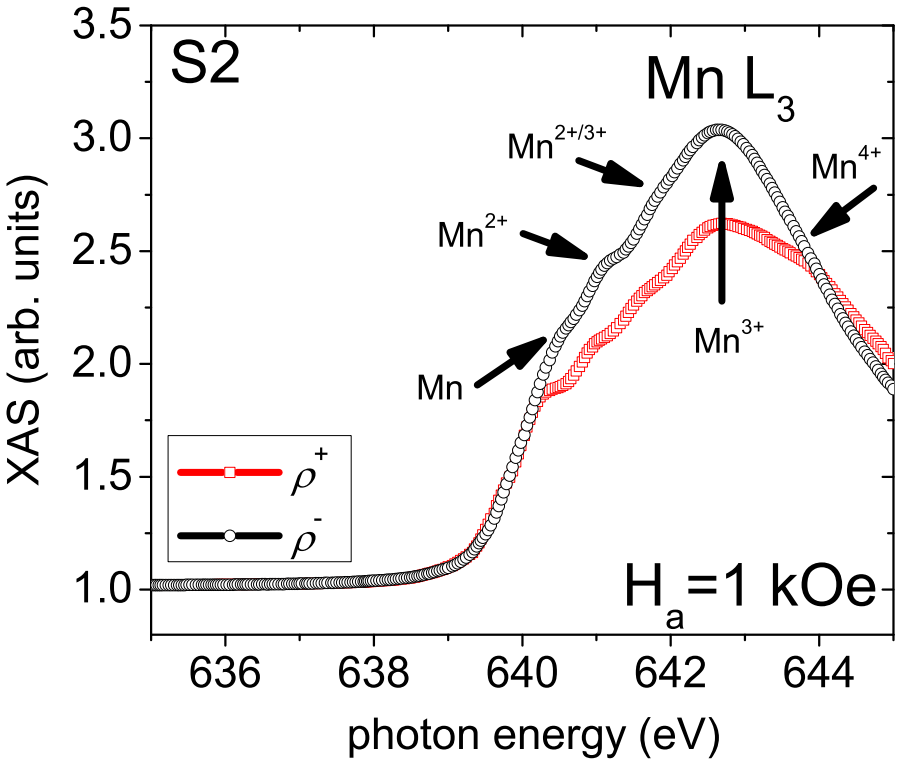

FIG. 2: (Color online) **Mn L edge XAS and XMCD spectrum of specimen S2.** TEY XAS measurements of the Mn $L_{3,2}$ edge with two different photon helicities (ρ^+ and ρ^-) measured at the remanence field after field cooling at 1 kOe for the S2 ML. The multiple arrows indicate the peak positions corresponding to the various oxidation states which are shown within the limited range of energy for clarity.

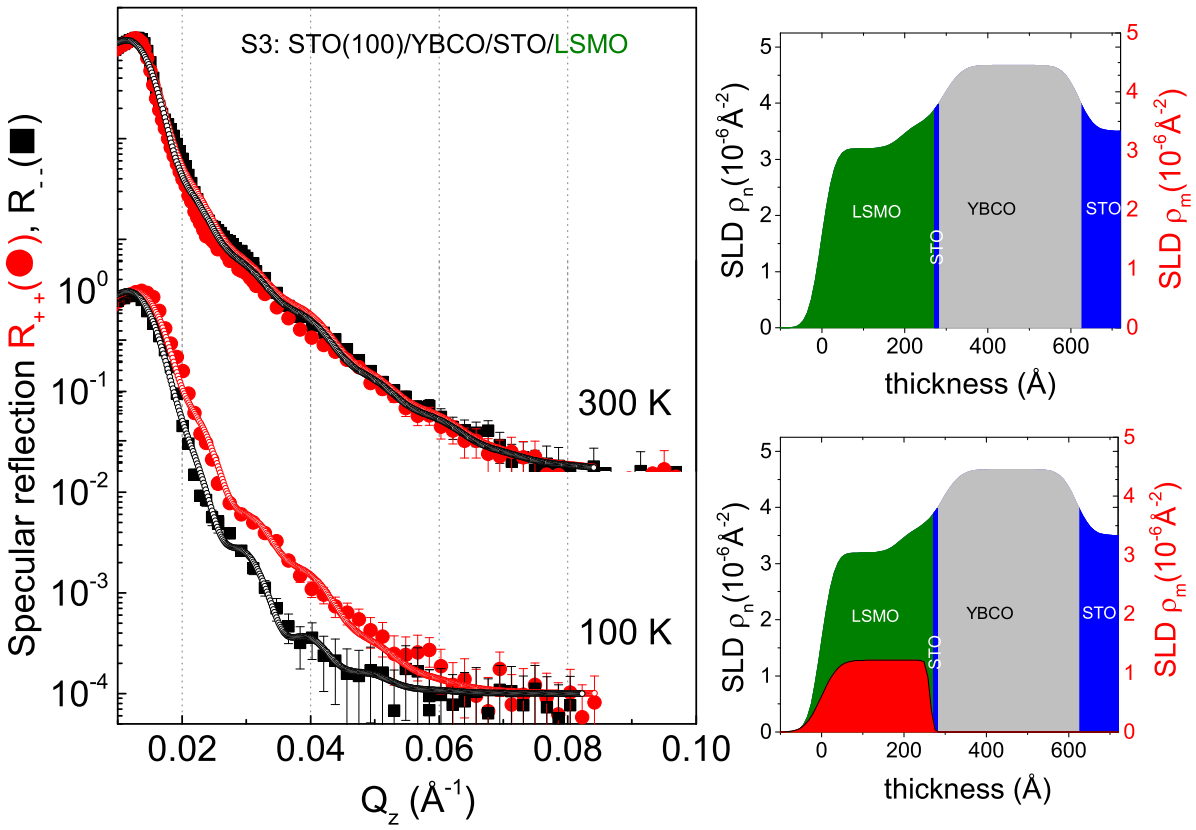

FIG. 3: (Color online) **PNR measurements of specimen S3 at 300 K and 100 K.** Specular neutron reflectivity patterns (solid symbols) along with their best fits (open symbols) as a function of Q_z for the NSF [R_{--} (black) and R_{++} (red)] channels measured at the saturation field $\mathbf{H}_a = +1.0$ kOe for the trilayer sample S3. The measurements are shown for two temperatures, 300 K and 100 K. The nuclear (ρ_n) and magnetic (ρ_m) SLDs versus the thickness of the trilayer are shown alongside.