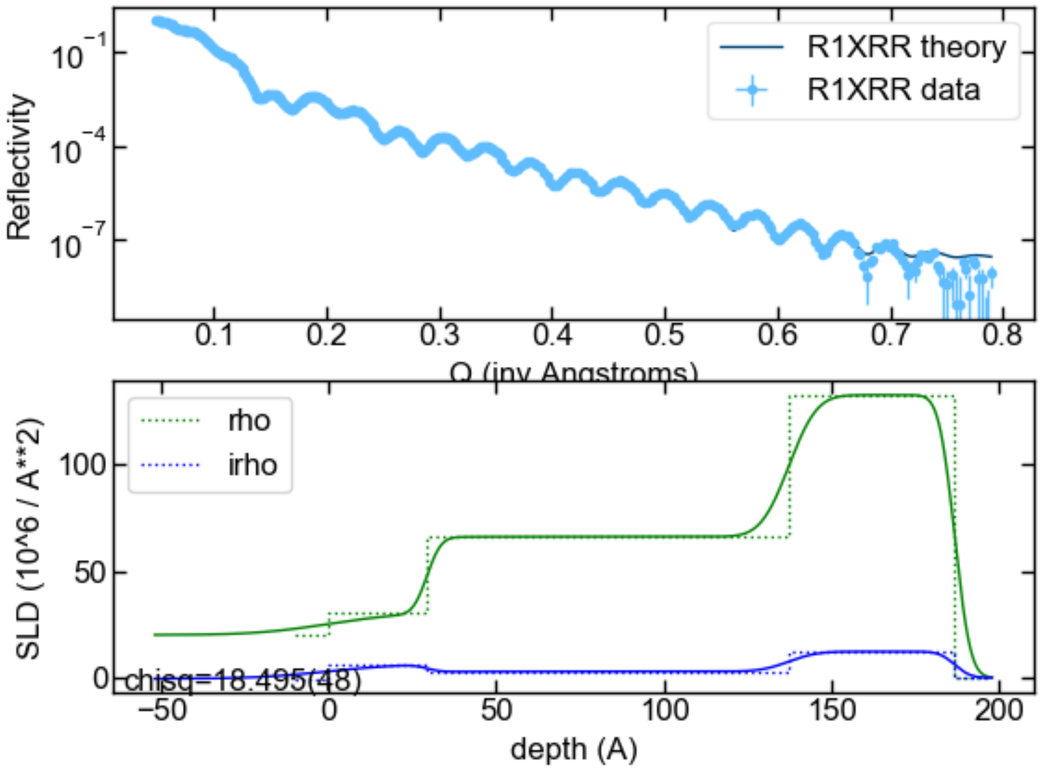
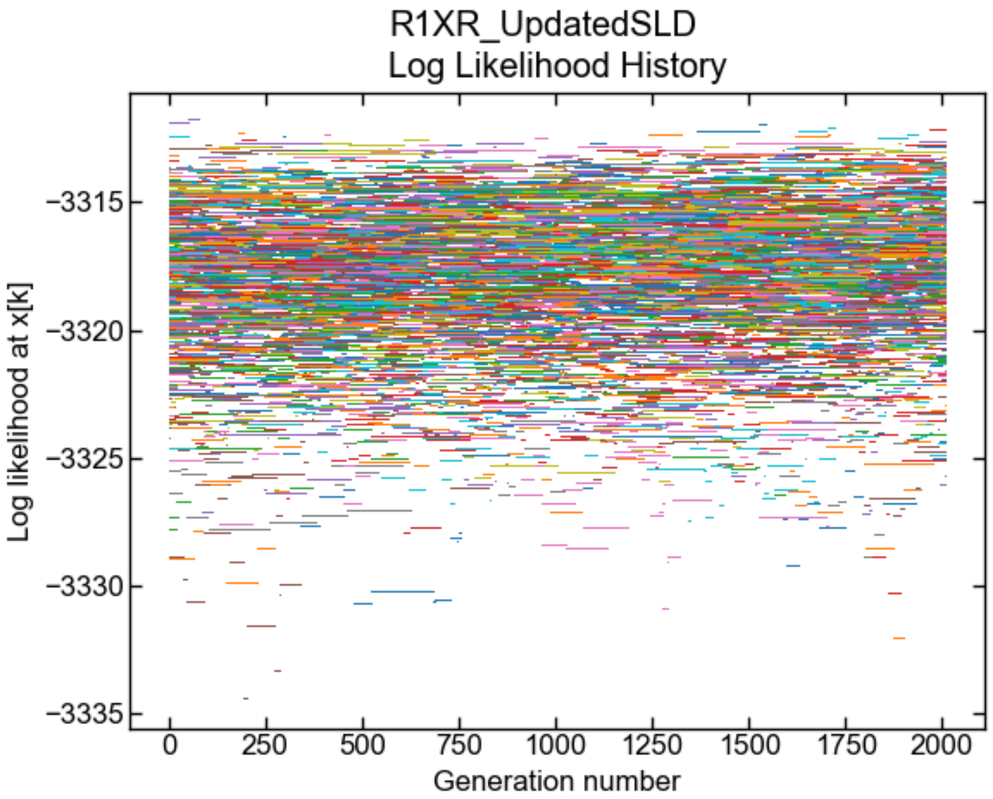
X-ray Reflectivity Best Fit: 5-Layer Box Model

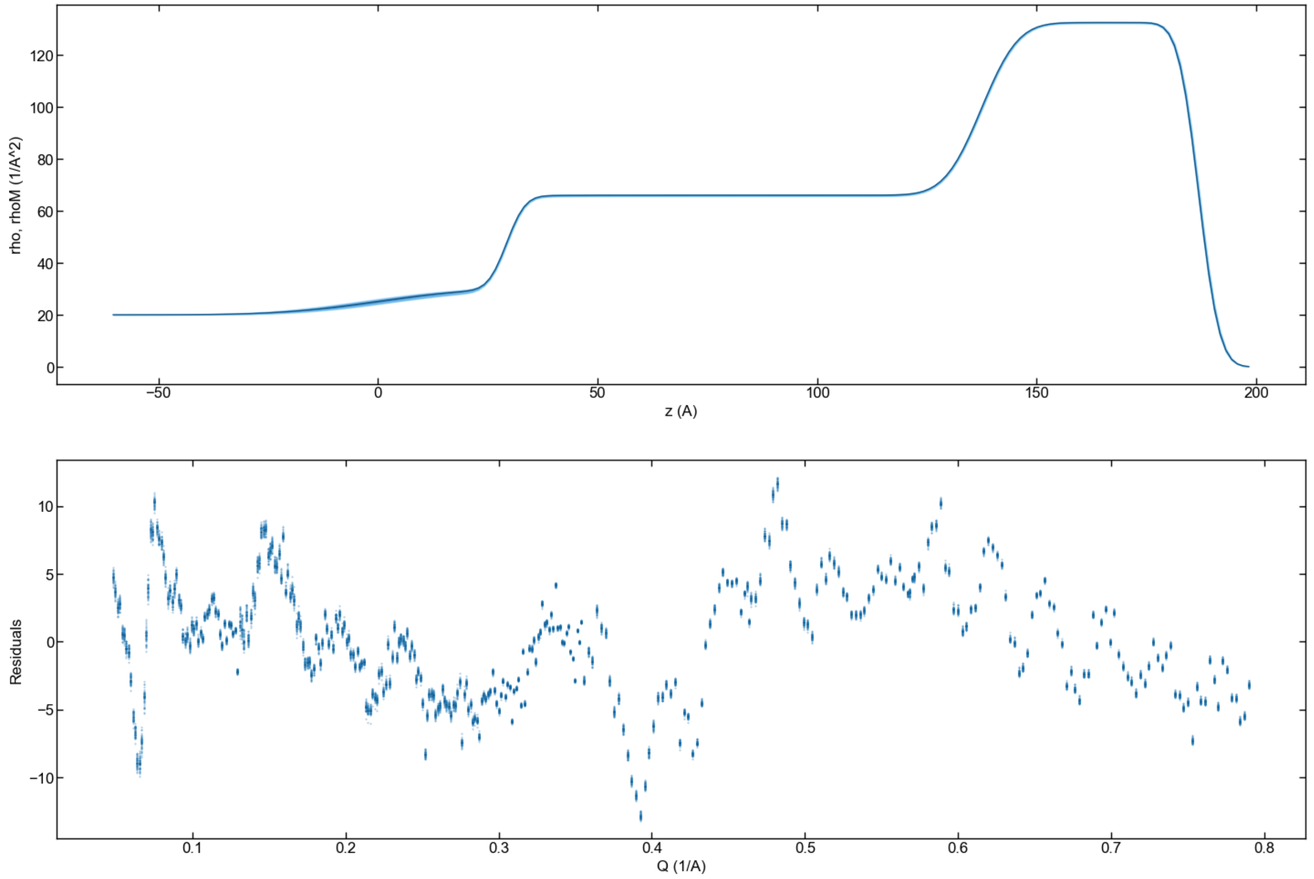


Parameter	Silicon	Oxide	Permalloy	Platinum	Air
roughness, σ (Å)	17.4 ± 0.6	3.32 ± 0.01	6.603 ± 0.013	3.711 ± 0.002	0.0
incoherent SLD, ρ_i (× 10–6 Å–2)	–0.458	6.4 ± 0.4	2.9 ± 0.2	12.24 ± 0.08	0.0
SLD, ρ (× 10^{-6} $Å^{-2}$)	20.07	30.4 ± 0.3	66.07 ± 0.18	132.5 ± 0.12	0.0
thickness, t (Å)	0.0	29.3 ± 1.7	108.10 ± 0.03	49.54 ± 0.02	0.0

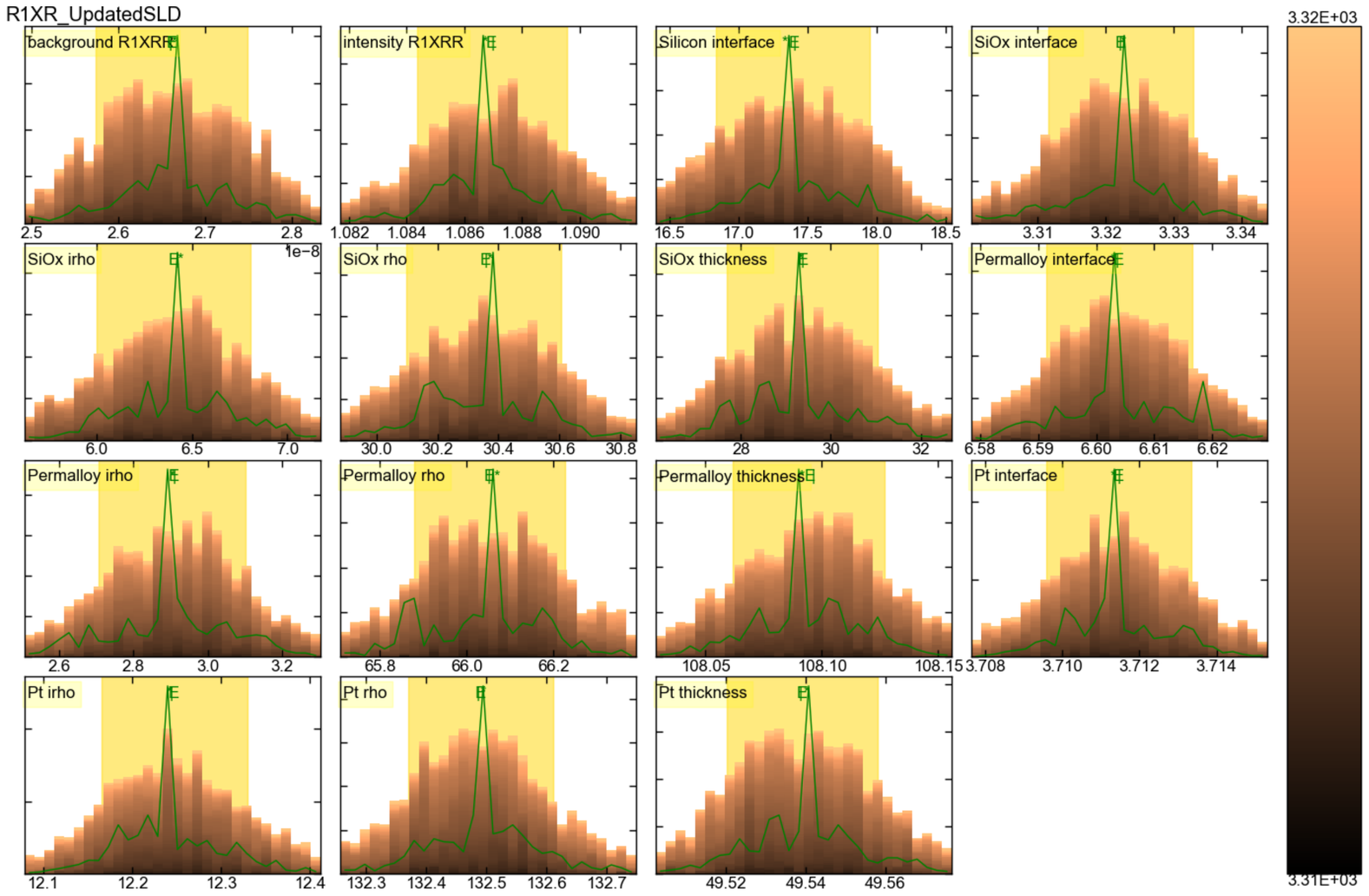
Simple box model composed of five layers:
silicon, oxide, permalloy, platinum, and air
All parameters in the silicon and air layers were fixed to *a priori* values (except for silicon roughness)
SLD of oxide layer is much greater than the nominal value, which we take to mean that there is some alloy due to the permalloy
Measured Value: (30.4 ± 0.3) × 10^{-6} $Å^{-2}$
Nominal Value: 17.7 × 10^{-6} $Å^{-2}$
Thicknesses and surface roughnesses for the permalloy and platinum layers are very similar to the values measured in the neutron fits

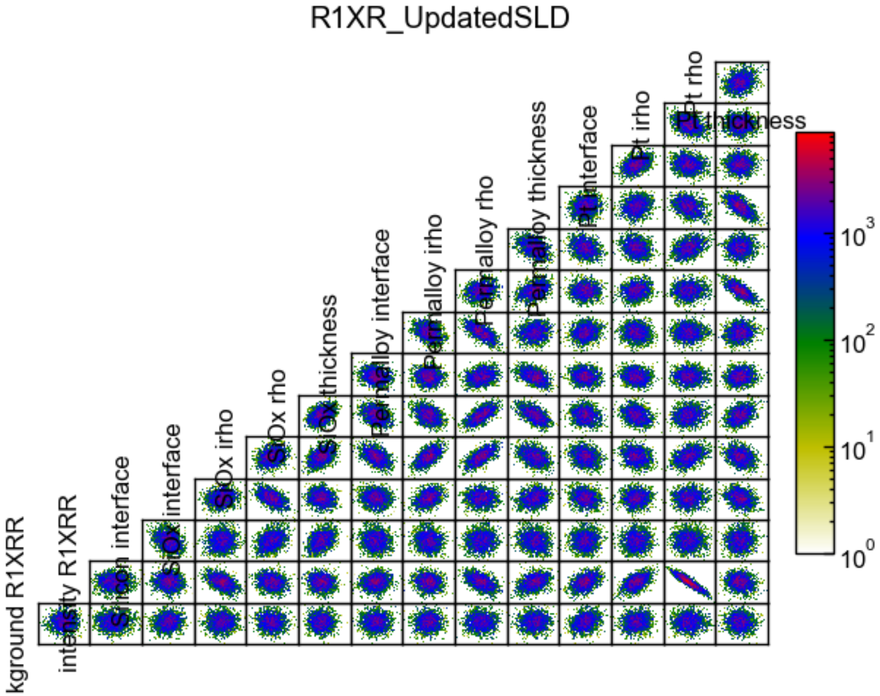
X-ray: Model converged with minimal model uncertainty





X-ray errors are normal and (mostly) uncorrelated





X-ray: Alternative fits rejected for zero thickness or high correlations

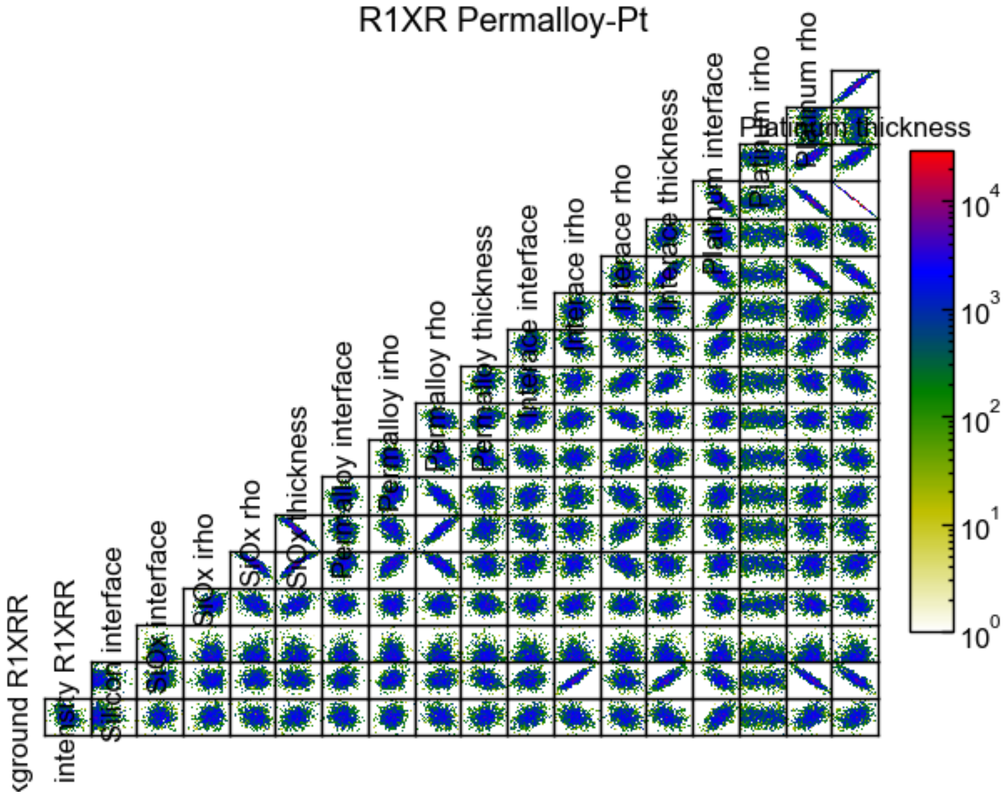
The existence of additional layers was tested for by fitting the data with an additional layer at each interface.

Each of these models improved the χ^2 and BIC, but the fits were rejected.

In the silicon/oxide and oxide/permalloy models, the thickness of the interfacial layer was 0 Å.

In the permalloy/platinum and platinum/air models the fit parameters were highly correlated and the surface roughness at the silicon/oxide interface was 0 Å

Model	χ2	BIC	Notes
best fit	18.495	6,710	box model without interfaces
silicon/oxide	15.667	5,659	zero interfacial thickness
oxide/permalloy	10.190	3,720	zero interfacial thickness
permalloy/platinum	5.100	1,918	highly correlated parameters
platinum/air	6.767	2,508	highly correlated parameters



Correlations between parameters for the permalloy/platinum fit.