Title: Characterization of magnetic and structural properties of superlattices
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The study of magnetic superlattices is one of the most important advances in material sciences and condensed matter physics in recent years, opening new avenues for fundamental studies and practical applications of magnetism. A superlattice is a structure made up of alternating layers of different materials. By stacking such thin materials together, the properties of the individual materials blend together in unexpected ways. The properties of the magnetic superlattices can be tailored by varying the layering sequence and are strongly affected by the structure of the individual layers and the interfaces. The structure is affected by the structure of the substrate and the temperature at which a layer is grown, i.e. different interfaces and layers have different growth conditions. Among the available techniques for structural and morphological characterization, x-ray reflectivity (XRR) has found large applications in the study of superlattices. Small angle reflectivity measurements provide information on the total superlattice thickness, the fluctuations of the layer thickness, electron density profile within the superlattice, critical angle, and the correlation of interface roughness. Computer simulations are performed to get a good fit of the experimental XRR patterns.