Band structure engineering of LaMnO$_3$:SrTiO$_3$ superlattices at
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We have made single crystal short period superlattices consisting of
alternating slabs of LaMnO$_3$ and SrTiO$_3$, using atomic layer by
layer molecular beam epitaxy. The supercells consist of $N$-layers of
each component, with $N=1$, 2, 3, 4. Ellipsometric measurements of the
new materials show that optical absorption in the visible light range is
significantly different from bulk LaMnO$_3$ or SrTiO$_3$, and depends on $N$.
The new band structure is dependent on the superlattice design. This is an
type of engineered coherent “meta-materials”, and this fabrication
technique can be extended to other lattice matched transition metal
oxides with a wide range of conducting and magnetic
properties.

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