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Cohomological obstructions to lifting properties for full group C- algebras*

We develop a new method, based on non-vanishing of second cohomology groups, for proving the failure of lifting properties for full C*-algebras of countable groups with (relative) property (T). We derive that the full C*-algebras of the groups $\mathbb{Z}^2 \rtimes \mathrm{SL}_2(\mathbb{Z})$ and $\mathrm{SL}_n(\mathbb{Z})$, for $n \geq 3$, do not have the local lifting property (LLP). We also prove that the full C*-algebras of a large class of groups with property (T) do not have the lifting property (LP). This is based on joint work with A. Ioana and P. Spaas.