On cross product Hopf algebras
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For $A, B$ algebras and coalgebras but not necessarily bialgebras in a braided monoidal category $\mathcal{C}$ we give necessary and sufficient conditions for which a cross product algebra and a cross coproduct coalgebra structure afford on $A \otimes B$ a bialgebra structure in $\mathcal{C}$. We also find sufficient conditions for which such a cross product bialgebra is a Hopf algebra in $\mathcal{C}$. We then describe those cross product Hopf algebras that are a double cross (co)product, a biproduct or, more generally, a smash (co)product Hopf algebra, respectively, and to each of them we associate the appropriate Hopf algebra projection context.

This is joint work with S. Caenepeel and B. Torrecillas.