Coding problems for trace monoids

The topic of codes in the framework of trace monoids leads to interesting and challenging decision problems of combinatorial flavour. We consider in this talk the unique decipherability problem (code problem), i.e. the question whether a (finite) subset X of a trace monoid generates a free monoid.

The code problem is in general undecidable, yet there is no exact characterization of the trace monoids where this problem is decidable. It is known that if the commutation relation I contains C_4, then the problem is undecidable. On the other side, if I contains neither C_4 nor P_4, then the code problem is decidable. Recently, it has been shown that if I is exactly P_4 (or, more general, acyclic), then the problem is again decidable.

We present in this talk new families of graphs (i.e., commutation relations I), where the code problem remains decidable. We also show that the code problem for $I = C_n$, $n \geq 5$, is recursively equivalent to the problem for $I = C_5$.