Sparsity and dimension

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Abstract: In this talk we will look at posets and their dimension through the lens of the Nesetril-Ossona de Mendez theory of sparsity for graphs. The type of questions studied here are of the following form: Given some fixed sparse class of graphs, is it true that posets whose cover graphs are in the class have dimension bounded in terms of their height? This is the case for instance for planar graphs, as shown by Streib and Trotter. There has been a flurry of positive results in that direction recently, including classes with bounded treewidth, bounded genus, and more generally excluding a fixed minor. I will first give an introduction to this area, assuming no background knowledge on posets. Then I will sketch a proof that the above property holds more generally for every class with bounded expansion, a result obtained jointly with Piotr Micek and Veit Wiechert. This is in a sense best possible, as it cannot be extended to nowhere dense classes; in fact, it already fails for classes with locally bounded treewidth.