Hypersurfaces of weak maximal contact in the resolution of singularities in positive characteristic

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Hypersurfaces of maximal contact play a crucial role in the proof of resolution of singularities of a variety of arbitrary dimension in characteristic zero. The construction of these hypersurfaces can be achieved via a change of coordinates that is called Tschirnhaus transformation. Its drawback is that this construction does not work in positive characteristic. It can even be shown that there are in general no hypersurfaces in positive characteristic that fulfill all the key properties that hypersurfaces of maximal contact in characteristic zero have. In this talk, we will discuss an analogous concept to the Tschirnhaus transformation in positive characteristic, the so-called cleaning. The hypersurfaces defined that way are called hypersurfaces of weak maximal contact. They have certain similarities to hypersurfaces of maximal contact in characteristic zero. We will see both their advantages and disadvantages for the resolution of singularities in positive characteristic.