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o-minimal Algebraic Geometry and Hodge Theory

(joint with B.Bakker and Y.Brunebarbe) One very fruitful way of studying complex algebraic varieties is by forgetting the underlying algebraic structure, and just thinking of them as complex analytic spaces. To this end, it is a natural question to ask how much the complex analytic structure remembers. One very prominent result in this direction is Chows theorem, stating that any closed analytic subspace of projective space is in fact algebraic. A notable consequence of this result is that a compact complex analytic space admits at most one algebraic structure - a result which is false in the non-compact case.

We explain how we can extend Chows theorem and its generalizations to the non-compact case by working with complex analytic structures that are 'tame' in the precise sense defined by o-minimality. This leads to some very general 'algebraization' theorems, which we apply to obtain new results in Hodge Theory. In particular, we use this technology to prove a conjecture of Griffiths on the algebraicity and quasi-projectivity of images of period maps.