

# TOPOLOGICAL RECONSTRUCTION THEOREMS FOR VARIETIES

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ABSTRACT. In modern algebraic geometry, a variety is typically expressed geometrically as a scheme - a topological space with a sheaf of rings. To what extent does the topological space alone determine the geometry of the variety? In joint work with János Kollár, Max Lieblich, and Martin Olsson, we give a partial answer to this question by showing that, under mild conditions on the variety, it is determined by its topological space together with its Picard group of Weil divisors, and over uncountable algebraically closed fields of characteristic zero, the topological space determines the Picard group, so one only needs the topological space. In this talk I will discuss the background for this problem, including a few cases where the answer is easier, and then the main ideas of the proofs, which rely on modified versions of the classical fundamental theorem of projective geometry.