To which extend does the group of automorphisms of an affine algebraic variety determines it?

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Abstract: We are going to discuss the following problem: to which extent the group of automorphisms of an affine algebraic variety determines the variety? Since "most" affine varieties have trivial automorphism groups, in general such groups can not determine the structure of varieties. On the other hand, H. Kraft proved that the group of automorphisms of the affine n-space seen as an ind-group determines the affine n-space in the category of connected affine varieties. In this talk we are going to discuss a similar result for affine toric varieties and some affine spherical varieties. In case of dimension two, we characterise a big class of affine surfaces by their automorphism groups viewed as abstract groups.