In 1969 Artin and Mazur defined the étale homotopy type \( \text{Et}(X) \) of a scheme \( X \) as a way to homotopically realize the étale topos of \( X \). In this talk we will consider the relative situation \( X \to S \) and define a relative version \( \text{Et}_{/S}(X) \) of this notion. We call it the \textbf{relative homotopy type of} \( X \) \textbf{over} \( S \).

It turns out that the relative homotopy type can be especially useful in studying the sections of the map \( X \to S \). In particular this notion can be used in order to obtain homotopy-theoretic obstructions to the existence of a section.

In the special case where \( S = \text{Spec}(K) \) is the spectrum of a field \( K \), the set of sections are just the set of \( K \)-rational points \( X(K) \). In that case the obstructions we obtain are a direct generalization of Grothendieck’s section obstruction. If furthermore \( K \) is a \textbf{global field} then these obstructions can be used to described various known arithmetic obstructions, such as the regular and étale Brauer-Manin obstructions. This point of view can be used to show new properties of these obstructions. (Received September 19, 2011)