Logic and Language of Relativity Theories

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Applying mathematical logic in the foundations of relativity theories is not a new idea at all, among others, it goes back to such leading mathematicians and philosophers as Hilbert, Reichenbach, Carnap, Gödel, Tarski, Suppes and Friedman.

There are many examples showing the benefits of using axiomatic method in the foundations of mathematics. That motivates the Hungarian school led by Hajnal Andréka and István Németi to apply this method in the foundations of relativity theories. This talk is based on the research of this school.

Our school's general aims are to axiomatize relativity theories within pure first-order logic using simple, comprehensible and transparent basic assumptions (axioms); and to prove the surprising predictions (theorems) of relativity theories using a minimal number of convincing axioms.

Via a sample of results in the application of axiomatic method to special and general relativity theories, we try to show that their application to physics is a promisingly fruitful research area.