1148-03-299 **François Dorais**, **Zachary Evans**, **Marcia Groszek** and **Seth Harris*** (sharris2@drew.edu), Hall of Sciences 302, Madison, NJ 07940, and **Theodore Slaman**. *Schmerl decompositions in first order arithmetic.*

Good m-tuples, m-tuples of r.e. sets without Schmerl decompositions, were introduced by Schmerl, who used them to investigate the reverse mathematics of Grundy colorings of graphs. Schmerl considered only standard m, for which our definitions of weakly good, good, and strongly good coincide. The existence of good tuples for nonstandard m depends on how much induction is available in the model. We show that in models of first-order arithmetic, over a base theory of $\mathsf{I}\Delta^0_1 + \mathsf{B}\Sigma^0_1 + \mathsf{EXP}$, the existence of arbitrarily long weakly good tuples is equivalent to $\mathsf{I}\Sigma^0_1$ and the existence of arbitrarily long good or strongly good tuples is equivalent to $\mathsf{B}\Sigma^0_3$. Consequences for second-order arithmetic include that, over RCA^*_0, the existence of arbitrarily long good tuples is equivalent to $\mathsf{B}\Sigma^0_3 + \neg\mathsf{ACA}$. (Received February 04, 2019)