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Motivic integration for Artin stacks

A standard method for studying a singular variety is to resolve it by a smooth variety and to then relate invariants of the singular variety to invariants of the smooth one. Motivic integration provides powerful tools for obtaining such a relationship. Motivated by the McKay correspondence, I will describe a context in which interesting varieties admit natural resolutions of singularities by Artin stacks. This suggests a need for versatile tools in studying these "stacky" resolutions of singularities. I will discuss joint work with M. Satriano in which we use motivic integration to provide such tools, and I will also explain how our work leads to a notion of crepantness for stacky resolutions of singularities.