1014-55-1018 **David J. Pengelley*** (`davidp@nmsu.edu`), Mathematical Sciences, New Mexico State University, Las Cruces, NM 88003, and **Frank Williams** (`frank@nmsu.edu`), Mathematical Sciences, New Mexico State University, Las Cruces, NM 88003. *Global Structure of Algebras of Invariants over the Steenrod Algebra and its Generalizations.*

Both the mod p cohomology of spaces and mod p algebras of invariants are unstable algebras over the Steenrod algebra $\mathcal{A}$. Some arise in both settings, like the cohomology of classifying spaces BO, BU, while others, such as the Dickson algebras of GL_n invariants, emerge primarily as invariants. While such $\mathcal{A}$-algebras often seem intractable as $\mathcal{A}$-modules, we find that they often have simple presentations as unstable $\mathcal{A}$-algebras via minimal generators and relations. We work with unstable $\mathcal{A}$-modules using the Kudo-Araki-May (K-A-M) algebra $\mathcal{K}$ of certain 'lower' operations as originally defined by Steenrod, before their conversion to 'Steenrod operations'. $\mathcal{K}$ is particularly suited to describing unstable modules.

We also find that, for p odd, Steenrod's original operations encompassed more than those converted for topology. This larger *algebraic* K-A-M algebra may yield expanded connections to invariants. In particular, Madsen and May proved that together the Dickson algebras are the dual of the *topological* K-A-M algebra $\mathcal{K}$; we will discuss how invariants under subgroups of GL_n may yield duals coming from the larger *algebraic* K-A-M algebra. (Received September 26, 2005)

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