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**David Blanc** and **Mark W. Johnson\*** (mwj3@psu.edu), Department of Mathematics, Penn State Altoona, 3000 Ivyside Park, Altoona, PA 16601, and **James M. Turner**. *On Obstructions to Realizing Diagrams of  $\Pi$ -algebras*.

The category of  $\Pi$ -algebras is the category of universal algebras containing, i.e. the natural categorical home for, the graded homotopy groups of a pointed topological space. Given a homotopy commutative diagram of pointed spaces, applying the graded homotopy groups functor yields a diagram of  $\Pi$ -algebras of the same shape. One can then ask if there is a strictly commutative diagram of pointed spaces which yields the same diagram of  $\Pi$ -algebras, called a realization of the diagram of  $\Pi$ -algebras. In work which recently appeared, the authors established an obstruction theory for realizing diagrams of  $\Pi$ -algebras, with the obstructions landing in Andre-Quillen cohomology groups. In the work to be discussed, the authors have since constructed various “local-to-global” spectral sequences for computing this Andre-Quillen cohomology in terms of the previously studied case of Andre-Quillen cohomology of a single  $\Pi$ -algebra.

Higher homotopy operations, such as Toda brackets, can also be described as obstructions to realizing certain diagrams of  $\Pi$ -algebras. Thus, the broader collaborative project seeks to use the cohomology of diagrams as a tool to organize higher homotopy operations. (Received January 21, 2008)