1048-55-28 **Samson Saneblidze** and **Ronald Umble*** (ron.umble@millersville.edu), Department of Mathematics, Millersville University, Millersville, PA 17551. *The homology of a DG bialgebra is an A_∞-bialgebra.*

Theorem *Consider a DG bialgebra (A, d, μ, Δ) over a field, its homology $(H = H(A), 0, \mu_*, \Delta_*)$, and a map $f : H \to A$ that sends each class to one of its representatives. Then there is*

1. *an A_∞-bialgebra structure $\{\omega^{j,i} : H^{\otimes i} \to H^{\otimes j}\}_{i,j\geq 1}$ on H such that $\omega^{1,2} = \mu_*$ and $\omega^{2,1} = \Delta_*$ and*
2. *an A_∞-bialgebra morphism $f : (H, 0, \omega_H) \Longrightarrow (A, d, \mu, \Delta)$ extending $\mathfrak{f}$.*

The chain map $\mathfrak{f}$ extends canonically to f. This extension is controlled by a new family of polyhedra that properly contains the multiplihedra. Indeed, the universal relative matrad structure on the cellular chains of these new polytopes induces the higher order operations $\omega^{j,i}$, $i + j > 3$. (Received December 14, 2008)