Rigidity of periodic cyclic complexes over $p$-adic integers

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Periodic cyclic homology of associative algebras generalizes in many ways DeRham cohomology and more generally crystalline cohomology of algebraic varieties over a field of characteristic zero. Among the properties of De Rham cohomology that can be so generalized are: rigidity under infinitesimal deformations and a regulator map from relative algebraic $K$ theory to relative cyclic homology of a nilpotent ideal (Goodwillie), and the Gauss-Manin connection (Getzler). I will explain how these results generalize to $p$-adic completions of cyclic complexes over $p$-adic integers. These generalizations develop recent results of Beilinson and Petrov-Vologodsky.