1096-13-501 **Hop Dang Nguyen** and **Thanh Quang Vu*** (vqthanh@math.berkeley.edu). *Koszul algebras and the Frobenius endomorphism.*

Let R be a standard graded algebra over a field of characteristic $p > 0$. Let $\varphi : R \to R$ be the Frobenius endomorphism. For each finitely generated graded R-module M, let ${}^{\varphi}M$ be the abelian group M with an R-module structure induced by the Frobenius endomorphism. The R-module ${}^{\varphi}M$ has a natural grading given by $\deg x = j$ if $x \in M_{jp+i}$ for some $0 \leq i \leq p-1$. In this talk, I will present a new criterion of Koszul algebras: R is Koszul if and only if there exists a non-zero finitely generated graded R-module M such that $\operatorname{reg}_R {}^{\varphi}M < \infty$. We derive this analog of Kunz's regularity criterion in positive characteristic by developing a theory of Castelnuovo-Mumford regularity over homomorphisms between $\mathbb{N}$-graded k-algebras, where k is a field of arbitrary characteristic. (Received September 05, 2013)