1056-11-431 **Matthew Papanikolas*** (map@math.tamu.edu), Department of Mathematics, Texas A&M University, College Station, TX 77843. *Values of Goss L-functions for Dirichlet characters at positive integers.* Preliminary report.

We will discuss values of Goss L-functions at positive integers and their relations to many prominent quantities in function field arithmetic. Let $\mathbf{F}_q[\theta]$ be a polynomial ring over the finite field with q elements, and let $\chi : \mathbf{F}_q[\theta] \to \overline{\mathbf{F}}_q$ be a Dirichlet character. For a positive integer n, special values of the Goss L-series for χ are defined by the series

$$L(n, \chi) = \sum_{a \in \mathbf{F}_q[\theta],\ \text{monic}} \frac{\chi(a)}{a^n},$$

which converges in the Laurent series field $\overline{\mathbf{F}}_q((1/\theta))$. In 1990 Anderson and Thakur considered the case of Carlitz-Goss zeta values, and showed that these values can be expressed as coordinates of logarithms on tensor powers of the Carlitz module. In 1996, Anderson considered additional characters and showed that $L(1, \chi)$ can be expressed in terms of logarithms of special points on the Carlitz module itself. We will show how to extend Anderson's log-algebraicity methods to tensor powers of the Carlitz module. Using this we find new formulas, which are explicitly related to the Carlitz period and Carlitz polylogarithms, for values of Goss L-functions at all positive integers. (Received September 06, 2009)