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**Byungchul Cha\*** ([cha@muhlenberg.edu](mailto:cha@muhlenberg.edu)), 2400 Chew st, Allentown, PA 18104. *Partial sum of the Möbius function in function fields.*

We study the growth rate of the summatory function of the Möbius function in the context of an algebraic curve over a finite field. Our work shows a strong resemblance to its number field counterpart, which was proved by Ng in 2004. We find an expression for a bound of the summatory function, which becomes sharp when the zeta zeros of the curve satisfy a certain linear independence property. Then, we consider a certain geometric average of such bound in a family of hyperelliptic curves, using Katz and Sarnak's reformulation of the equidistribution theorem of Deligne. Lastly, we study an asymptotic behavior of this average as the family gets larger by evaluating the average values of powers of characteristic polynomials of random unitary symplectic matrices. (Received September 19, 2010)