1096-VN-1964 **Lisa Kaylor**, Wesleyan University, Middletown, CT 06459, and **David Offner***, Westminster College, New Wilmington, PA 16172. *Counting Matrices Over a Finite Field With All Eigenvalues in the Field.*

Given a finite field $\mathbb{F}$ and a positive integer n, we give a procedure to count the $n \times n$ matrices with entries in $\mathbb{F}$ with all eigenvalues in the field. We give an exact value for any field for values of n up to 4, and prove that for fixed n, as the size of the field increases, the proportion of matrices with all eigenvalues in the field approaches $1/n!$. The proofs of these results rely on the fact that any matrix with all eigenvalues in $\mathbb{F}$ is similar to a matrix in Jordan canonical form, and so we proceed by counting the number of $n \times n$ Jordan forms, and how many matrices are similar to each one. A key step in the calculation is to characterize the matrices that commute with a given Jordan form and count how many of them are invertible. (Received September 16, 2013)