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**Elizabeth J. Bodine\*** ([ebodine@math.wsu.edu](mailto:ebodine@math.wsu.edu)), Department of Mathematics, Washington State University, Box 643113, Pullman, WA 99164-3113, and **Judith J. McDonald** ([jmcdonald@math.wsu.edu](mailto:jmcdonald@math.wsu.edu)), Department of Mathematics, Washington State University, Box 643113, Pullman, WA 99164-3113. *Spectrally arbitrary patterns of matrices over finite fields.*

A zero-nonzero pattern  $\mathcal{A}$  is spectrally arbitrary over a finite field  $\mathbb{F}_q$  provided that for each monic polynomial  $r(x) \in \mathbb{F}_q[x]$ , there exists a matrix  $A$  over  $\mathbb{F}_q$  with zero-nonzero pattern  $\mathcal{A}$  such that the characteristic polynomial  $p_A(x) = r(x)$ . This is analogous to the study of spectrally arbitrary patterns over  $\mathbb{R}$ , but yields some very different results that rely heavily on the structure of finite fields. In this talk, we will investigate several zero-nonzero patterns and identify over which finite fields these patterns are spectrally arbitrary. (Received September 18, 2009)