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Location of eigenvalues of non-self-adjoint discrete Dirac operators and Lamé operators

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Abstract: We provide quantitative estimates on the location of eigenvalues of the discrete Dirac operator in dimension 1 and the Lamé operator of elasticity in dimension $d \geq 2$, relying on the Birman-Schwinger principle. On the one hand, we treat one-dimensional discrete Dirac operators with non-hermitian ℓ^1—potentials, and, as a corollary, we determine subsets of the essential spectrum that are free of embedded eigenvalues for small potentials. Moreover, we show that our results are sharp for eigenvalues in the complex plane outside a region. Further results and sharpness of the obtained spectral bounds are also discussed for ℓ^p–potentials, with $1 < p \leq \infty$. On the other hand, we treat the Lamé operators of elasticity in dimension $d \geq 2$ with non-hermitian potentials in Lebesgue, Morrey-Campanato or Kerman-Sayer spaces. Moreover, we get results of spectral stability for small potentials in dimension $d \geq 3$. These results are respecively a joint work with O.O. Ibrogimov, D. Krejčiřík and F. Štampach, and a joint work with L. Cossetti and L. Fanelli.