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**A new test for missing levles using the $\Delta_3(L)$ statistic** DECLAN MULHALL, University of Scranton — The $\Delta_3(L)$ statistic of Random Matrix Theory is a measure of how a spectrum deviates from the equidistant harmonic oscillator spectrum. While it is usually used as a signature of quantum chaos, in this work it is used to gauge the incompleteness of an experimental spectrum. Two approaches are presented. In the first, the $\Delta_3(L)$ statistic extracted from the experimental data is compared to randomly depleted spectra in numerical simulations. The second approach depends on the fact that $\Delta_3(L)$ is the mean value of a quantity that is evaluated many times over the spectrum. These values are not statistically independent, and their distribution is non trivial. In this second approach this distribution of numbers (whose average is $\Delta_3(L)$) is parametrized, and a maximum likelihood method is then developed as a tool to detect missing levels.

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