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**Level correlations in an integrable potential system: a modified Kepler problem** TAO MA, Uiversity of Cincinnati, BERNARD GOODMAN, ROSTISLAV SEROTA, University of Cincinnati — We investigate level correlations in the semiclassical energy spectrum of a modified Kepler problem. The latter features the exponential distribution of the nearest level spacings typical of "generic" (that is without extra degeneracies) integrable systems. Numerically, moving up in spectrum, we observe jumps of saturation level rigidity at certain values of energy. Also in saturation regime, we observe large oscillations of the level number variance over an energy interval as a function of the interval width; these have fixed period and amplitude and the variance reaches near zero values with the same periodicity. These unusual spectral properties are explained using both the periodic orbit theory and a derivation based directly on the quantum mechanical spectrum in the semiclassical limit. Numerical and analytical results are in excellent agreement.

Rostislav Serota
University of Cincinnati

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