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Pythagorean comma, Buckingham Pi theorem, dimensional analysis, and harmonic power laws of the frequency equivalents of the electron, Bohr radius, and Rydberg constant DONALD CHAKERES, Ohio State Univ - Columbus — Purpose: The Pythagorean comma refers to a musical Euclidian mathematical tuning method that defines a ratio power law inter-relating two frequencies and a virtual frequency analogous to a beat. This frequency is derived utilizing the Buckingham II theorem and dimensional analysis. It is physically related to the frequency ratio, and superposition of two waves. The virtual frequency is defined as closest to 1 Hz for the smallest possible physically valid powers. The product ratios of the frequency equivalents of the electron, Bohr radius, and the Rydberg constant are known Standard Model (SM) power laws of 2, π , and the fine structure constant. The hypothesis is that their Pythagorean power laws represent are a classic harmonic power system, and are equivalent/ isomorphic transformations of the SM. Methods: We analyze the three quanta as Hertzian equivalents utilizing Pythagorean, Buckingham, dimensional analysis methods. We utilize a computer search engine to derive the powers. We analyze if there is a systematic harmonic power law organization, and if it is equivalent/ isomorphic with the SM. Results: The hydrogen Pythagorean power laws demonstrate classic harmonic patterns, and are isomorphic with the SM. Conclusions: The ancient Greeks described a power law system that defines wave interactions. When this method is utilized for quantum constants this is equivalent to viewing quanta from a 2D natural unit power Fourier perspective. The SM is an isomorphic harmonic power system.

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