

Abstract Submitted
for the APR09 Meeting of
The American Physical Society

The Harmony of Physics, Mathematics, and Music: A discovery in mathematical music theory is found to apply in physics RICHARD KRANTZ, Metropolitan State College of Denver, JACK DOUTHETT, Central New Mexico CC (retired) — Although it is common practice to borrow tools from mathematics to apply to physics or music, it is unusual to use tools developed in music theory to mathematically describe physical phenomena. So called “Maximally Even Set” theory fits this unusual case. In this poster, we summarize, by example, the theory of Maximally Even (ME) sets and show how this formalism leads to the distribution of black and white keys on the piano keyboard. We then show how ME sets lead to a generalization of the well-known “Cycle-of-Fifths” in music theory. Subsequently, we describe ordering in one-dimensional spin-1/2 anti-ferromagnets using ME sets showing that this description leads to a fractal “Devil’s Staircase” magnetic phase diagram. Finally, we examine an extension of ME sets, “Iterated Maximally Even Sets” that describes chord structure in music.

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Date submitted: 06 Jan 2009

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