Role of Finite Size in Triggering Excess Heat: Why Nanoscale PdD Crystals Turn on Faster

SCOTT CHUBB, Research Systems Inc, 9822 Pebble Weigh Ct., Burke, VA 22015 — Two persistent questions have been: 1. Why is a finite triggering time required after the near full-loading condition (PdD<sub>x</sub>, 0.85 ≈< x → 1) before the Excess Heat effect is observed? 2. Is it possible to identify physical properties of the materials and/or crystals that are used that might be playing a role in the length of the interval of time associated with this phenomenon? In the talk, through a generalization of conventional energy band theory, as it applies to infinitely-repeating, periodic lattices to situations involving finite lattices, I have been able to address both questions. In particular, the tunneling time depends on crystal size. Crystals with dimensions ≈< 6 nm, which have tunneling times ≈ microseconds, either can not provide enough momentum to initiate d+d→<sup>4</sup>He reactions or conduct ion charge so rapidly that collisions occur. Crystals with dimensions ≈ 60nm create heat and load rapidly (≈ 3 ms). But crystals with dimensions >≈60 microns have tunneling times that are longer than a month.