

Abstract Submitted
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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_x , $0.85 \approx x \rightarrow 1$) before the Excess Heat effect¹ 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 generalization² 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 $\approx < 6$ nm, which have tunneling times \approx microseconds, either can not provide enough momentum to initiate $d+d \rightarrow {}^4\text{He}$ reactions or conduct ion charge so rapidly that collisions occur. Crystals with dimensions ≈ 60 nm create heat and load rapidly (≈ 3 ms). But crystals with dimensions $> \approx 60$ microns have tunneling times that are longer than a month.

¹C.G. Beaudette, Excess Heat: Why Cold Fusion Research Prevailed. (Oak Grove Press, Bristol, ME, 2002)

²S.R. Chubb, "Role of Broken Gauge Symmetry on Conduction of Charged and Neutral Particles in Finite Lattices," submitted to Proc Roy. Soc Series A (2005).

Scott Chubb
Naval Research Laboratory

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