

Kent State University

Physics Colloquium

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If You Can't Stand the Hot (Stones), Get Out of the Kitchen!

Abstract

Ionizing radiation, the subatomic particles with energies large enough to cause genetic mutations and potentially cancer, surrounds us. It rains on us from above, is in our food, rises into the air from the ground under our homes, and is key to many beneficial medical diagnostic and therapeutic procedures. I, and my relativistic heavy-ion physics colleagues at Kent State, are aware of and comfortable with an additional exposure beyond this natural background resulting from our research at accelerator facilities. One day a few years ago, I was asked to appear in a local TV news piece investigating a homeowner's claim that his granite kitchen countertops had killed his dogs and was thus assumed to be greatly endangering his family. This propelled me into few-year hobby to understand the physics of radiation from granite countertops. Along the way, I ran into (unnecessarily) angry granite retailers, a public already overly worried about radiation risks, local and national media coverage, and several forms of subtle industrial subterfuge. At the same time, I collected a wide variety of samples of granite countertops available for sale to homeowners from random granite dealers, and then measured the radiation rates and activity concentrations of the major radioactive sources, 40-K, U-nat, and 232-Th, using a "full spectrum analysis". An anthropomorphic phantom and the "geant4" physics simulation package was used to relate the measured activity concentrations to the potential yearly direct-radiation doses to kitchen occupants. The results were published [1]. In this talk, I will share with you some of the things I learned from this hobby.

[1] W.J. Llope, "Activity concentrations and dose rates from decorative granite countertops", Journal of Environmental Radioactivity, Volume 102, Issue 6, June 2011, Pages 620-629, ISSN 0265-931X.

THURSDAY, NOVEMBER 19, 2015
1:30 PM
SMITH HALL 111
REFRESHMENTS: 1:15 PM – SMITH HALL LOBBY