The High-Energy Photoelectrons Required to Model the Shielded-Button Signals May Be Auger Electrons

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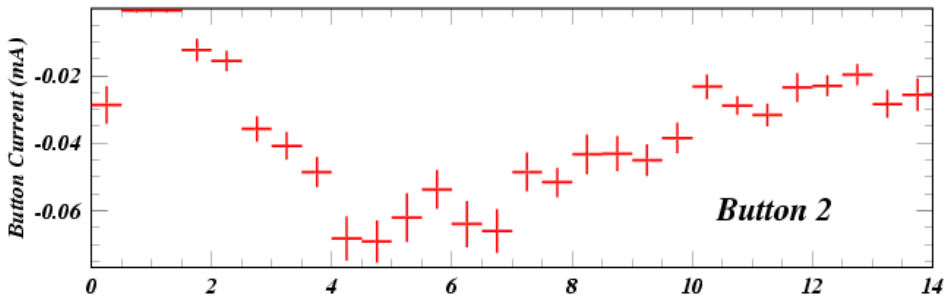
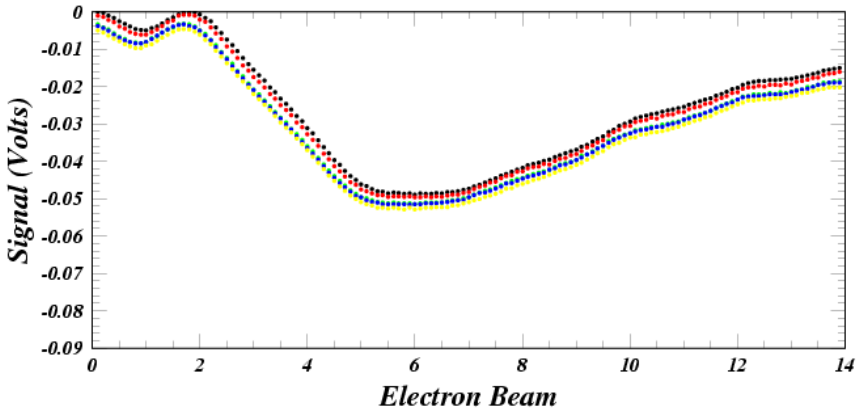
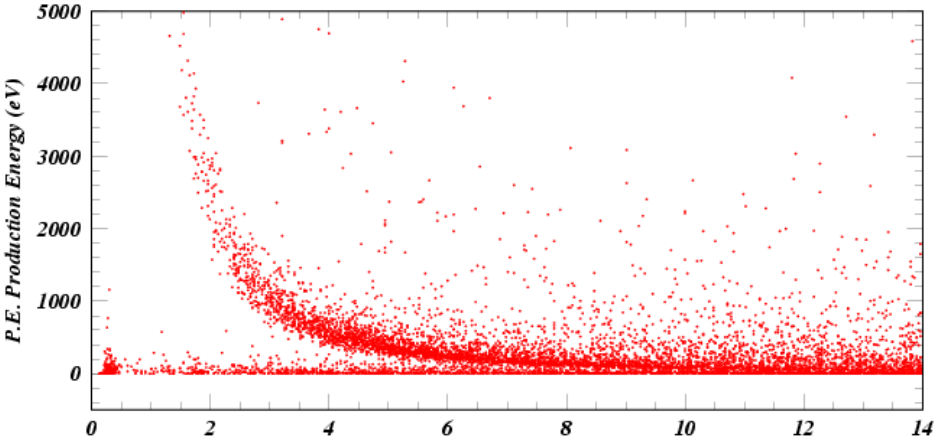
ECLOUD modeling indicates high-energy photoelectrons are necessary to explain the 3/16 8.6 mA/bunch electron data



15E (TiN) Shielded Button Measurements (3/16/2010, 5.3 GeV, 8 mA bunch)



Job 16639: Button Signal Macroparticles For 0 < T < 14 ns



The measured signal arrives 2 ns after bunch passage. The repulsion of the photoelectrons from an electron bunch carrying 8.6 mA requires that the kinetic energy necessary to such an early arrival time must come from the p.e. production process. The energy required is approximately 1.5 – 2 keV.

Auger Effect Dominant for High-Energy X-rays

HUTTULA *et al.* PHYSICAL REVIEW A **79**, 023412 (2009)

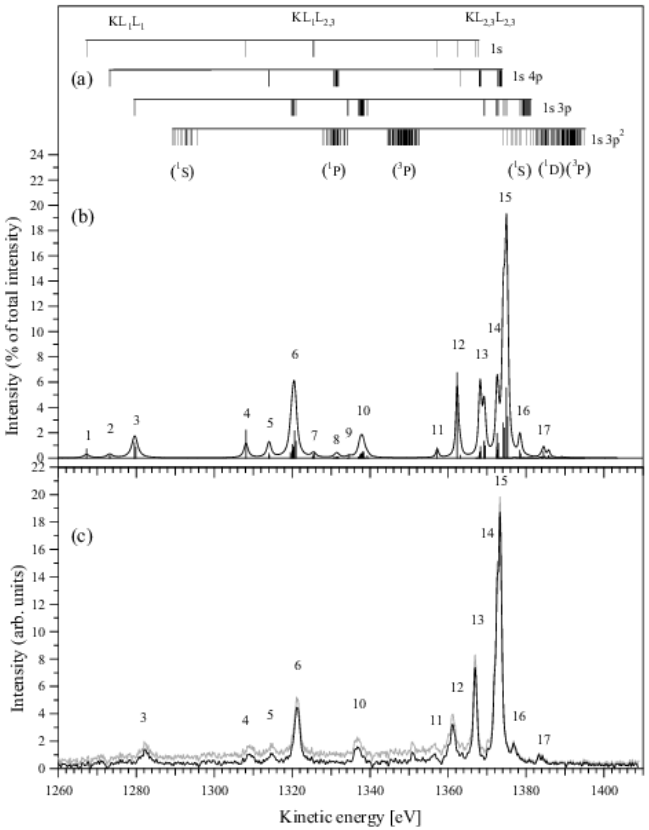


FIG. 1. *KLL* Auger spectrum of aluminum. (a) Calculated Auger energies (bars) are grouped according to initial configuration with connecting line. Parents of final-state terms are given below the bars. (b) Simulated *KLL* Auger spectra (envelope curve) and calculated Auger transitions (bars). Assignments for labels 1–17 are given in Table I. (c) Experimental spectrum measured using 4 keV electron impact with subtraction of Shirley background (black line) and linear background (gray line).

Ken Finkelstein pointed out that photons above threshold energy predominantly produce an Auger effect in aluminum producing kinetic energies of 1.3 – 1.4 keV.

The 15W data may be helpful, because 1) v.c. is bare Al, and 2) B field at source is 2 kG rather than 3 kG.