



Canadian Association  
of Physicists

Association canadienne  
des physiciens et physiciennes

Contribution ID: 409 Type: **Oral Competition (Graduate Student) / Compétition orale (Étudiant(e) du 2e ou 3e cycle)**

## **(G\*) A Measurement of Zinc-65 Using Data from the KDK Experiment**

*Monday 7 June 2021 17:20 (10 minutes)*

Zinc-65 (Zn-65) is a radionuclide of interest in the fields of medicine and gamma-ray spectroscopy, within which its continued use as a tracer and common calibration source necessitates increasingly-precise nuclear decay data. A Zn-65 dataset was obtained as part of the KDK ("potassium decay") experiment, whose apparatus consists of an inner X-ray detector and an efficient outer detector, the Modular Total Absorption Spectrometer (MTAS), to tag gamma rays. This setup allows for the discrimination of the electron capture decays of Zn-65 to the ground (EC) and excited (EC) states of Copper-65 (Cu-65) using an emerging technique for such a measurement, exploiting the high efficiency ( $\sim 98\%$ ) of MTAS. Techniques used to obtain the ratio  $\rho$  of EC to EC decays are applicable to the main KDK analysis which is making the first measurement of  $\rho$  for Potassium-40, a common background in rare-event searches such as those for dark matter. The KDK instrumentation paper (under review by NIM) pre-print is available at arXiv:2012.15232. We present our current methodology and analysis procedures developed to obtain a novel measurement of the electron-capture decays of Zinc-65.

**Primary author:** HARIASZ, Lilianna (Queen's University)

**Co-authors:** RASCO, B.C. (Oak Ridge National Laboratory Physics Division, Oak Ridge, TN, USA); LUKOSI, E.D. (Department of Nuclear Engineering, University of Tennessee, Knoxville, TN, USA); DAVIS, H. (Department of Nuclear Engineering, University of Tennessee, Knoxville, TN, USA); RYKACZEWSKI, K.P. (Oak Ridge National Laboratory Physics Division, Oak Ridge, TN, USA); STUKEL, Matthew (Queen's University); BREWER, N.T. (Oak Ridge National Laboratory Physics Division, Oak Ridge, TN, USA); DI STEFANO, Philippe (Queen's University)

**Presenter:** HARIASZ, Lilianna (Queen's University)

**Session Classification:** M4-5 Nuclei & Astrophysics II (DNP) / Noyaux et astrophysique II (DPN)

**Track Classification:** Nuclear Physics / Physique nucléaire (DNP-DPN)