



Contribution ID: 737

Type: **Oral (Non-Student) / orale (non-étudiant)**

Atomic Recoil Processes following He-6 Beta Decay

Wednesday, June 17, 2015 2:00 PM (15 minutes)

There are currently several experiments in progress to search for new physics beyond the Standard Model by high precision studies of angular correlations in the β decay of the helium isotope ${}^6\text{He} \rightarrow {}^6\text{Li} + e^- + \bar{\nu}_e$. An essential part of the analysis is to understand the energy distribution and spectra of the recoil ions. After the β decay event, the atomic electrons suddenly find themselves in a ${}^6\text{Li}^+$ environment with nuclear charge $Z = 3$. The electrons redistribute themselves over all possible states of the ${}^6\text{Li}^+$ ion, including the continuum leading to ${}^6\text{Li}^{++}$ and ${}^6\text{Li}^{3+}$. Evidence for new physics beyond the Standard Model would reveal itself by an additional tensor coupling contribution to the weak interaction, in addition to the simple Gamow-Teller axial-vector mechanism. We will present calculations employing Stieltjes imaging techniques in Hylleraas coordinates to study the probabilities for the shake-up and shake-off mechanisms, and especially the additional recoil accompanying the emission of the shake-off electrons. The results are of key importance in the interpretation of angular correlations following β decay.

Primary author: Dr DRAKE, Gordon (University of Windsor)

Co-author: Ms SCHULHOFF, Eva (University of Windsor)

Presenter: Dr DRAKE, Gordon (University of Windsor)

Session Classification: W2-10 Spectroscopy and Optics (DAMOPOC) / Spectroscopie et optique (DPAMPC)

Track Classification: Division of Atomic, Molecular and Optical Physics, Canada / Division de la physique atomique, moléculaire et photonique, Canada (DAMOPOC-DPAMPC)