ELECTRIC DIPOLE MIXING IN PHOTON INDUSED INNER-SHELL MAGNETIC QUADRUPOLE TRANSITIONS
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ABSTRACT

Up to now, in studies of the angular distribution of the \( L_3 \) magnetic sub-shell X-ray transitions it has been generally assumed that observed radiations consist of pure electric dipole (E1) allowed transitions and contributions from higher-order multipole terms (forbidden transitions such as (M1, E2, M2, ...)) have been usually overlooked. However, the contribution of these transitions especially of magnetic quadrupole transitions (M2), to the atomic X-ray transitions increases with increasing energy of the X-ray transition and atomic number. This can give rise to modify of the angular distributions, of the polarization and so of the anisotropy (b) and of the correlation parameters (A_{22}) and of the transition rates of electric dipole allowed K, L, M... X-ray spectral lines in the region of heavy elements or cause produce of the some weaker lines in the spectra.

In the study, the \( L_3 \) sub-shell alignment (A_{2}, the nonstatistical population of the various magnetic substates) parameters and the anisotropy (b) parameters of 1. X-ray lines have been measured by the analysis of the angular distribution of the \( L_3 \) (2p_{32}) magnetic sub-shell X-ray transitions of Th, U, Ba and Er elements and from the measured parameters a kinematic coefficients (depend on the total angular momenta of the initial and final states and on the mixing ratios of the X-ray transitions), \( d_1(M2/E1) \) mixing ratios and polarization degrees (P) were deduced by energy dispersive X-ray fluorescence (EDXRF) for LC(\( L_3 - M_0 \)), L\( \beta \), (\( L_3 - N_0 \)) and L\( \beta \), (\( L_3 - N_k \)) transitions. The obtained results were compared with experimental results and theoretical predictions available in the literature up to now.

THE INVESTIGATION OF 115 IN NUCLEUS AT CLIC-LHC BASED FEL NUCLEUS COLLIDER
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ABSTRACT

This work proposes collision of Indium nuclei beam which is accelerated at LHC phase II with a Free Electron Lazer (FEL) beam provided by the Compact Linear Collider (CLIC) drive beam. Physics potential of this collider will be discussion via investigat of In nuclei. FEL beam is ideal source for Nuclear Resonance Fluorescence (NRF) method.

A DECONVOLUTION TECHNIQUE FOR MEASURING LOW-ENERGY BETTA ACTIVITY IN SAMPLES CONTAMINATED WITH HIGH-ENERGY BETTA IMPURITIES
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ABSTRACT

The paper presents the results obtained in the implementation and validation processes for a liquid scintillation spectrometric method used to measure the activity of a low energy pure beta emitter in the presence of other beta emitting radionuclides (impurities). The method is based on deconvolution of the total spectrum with reconstruction of the beta spectrum of the nuclide of interest. The hypothesis used is that the ratio of the net counting rate in two different regions for a given radionuclide is a constant for a given level of quench and thus the spectral shape of the radionuclide could be reconstructed by using a reference spectrum at the same quench level. When the sample contains more than a single radionuclide the reconstructed impurities spectra could be subtracted from the spectrum of sample to obtain the spectrum of the nuclide of interest. The advantage resides in the fact that just the activity concentration for the standard solution from nuclide of interest should be accurately known and there are no quench correction curves required for activity calculation. When the activity concentrations for reference solutions of the impurities are known, the activities of the impurities could also be calculated.