

FITTING AND UPDATING GAMMA-RAY ENERGIES

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Experimental values of physical quantities are, often, correlated. Since correlation coefficients are related to variances and covariances, covariance matrices must be taken into account in every step of a fitting procedure. Also, covariance matrices are necessary to update values every time new experimental results are obtained or some quantities correlated to those values are changed.

In this contribution we show the Least Squares Method design matrix which takes into account the cross-over relations, recoil energies, and the dependence on the fundamental constants. The formulas are applied to the experimental data related to gamma-ray energies given in ref. [1] by using the procedure described in ref. [2].

Since gamma-ray energies (in eV) are related to some fundamental constants (Planck constant, speed of light, elementary charge, and the Si lattice parameter), the obtained gamma-ray energies must be updated to the 1998 CODATA recommended values [3] (in ref [4] the procedure was applied just to the ^{198}Au and ^{192}Ir gamma-ray energies).

Using the experimental information quoted in ref. [1] we fitted 329 standard gamma-ray energies updating them to the 1998 recommended fundamental constants. The covariance matrix of the gamma-ray energies and the related fundamental constants was directly obtained from the procedure.

References

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