

# Program TDCR07c

## TDCR and tracer methods in LSC

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### Purpose

The TDCR07c program is a MS-DOS application devoted to the calculation of detection efficiencies and figure-of-merit of 3-photomultiplier tubes Liquid Scintillation Counters for beta radionuclides. It can be used to implement the TDCR method as well as a tracer method (CIEMAT/NIST or similar) in LSC.

### License

This software is provided on an "as is" basis.

The use of TDCR07c is free for scientific purpose and non-commercial applications. Persons interested in for-profit use should contact the author. Please report any comment, bug or upgrade suggestions to the author. Source files (FORTRAN) are available on request.

### Disclaimer

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### Models

The physical models used are the following:

- LS-light emission statistics: Poisson law.
- Scintillator non-linearity: Birks law for various kB values.
- Stopping power of electrons in the scintillator: ICRU n°37 formula over 100 eV and linear extrapolation to zero under 100 eV.
- Beta spectra calculation: Fermi model with optional shape factor for forbidden transitions. Short library of usual Possibility to read an experimental spectrum file.

For more details on TDCR or tracer methods and models, see: R. Broda, P. Cassette and K. Kossert. Radionuclide metrology using liquid scintillation counting. *Metrologia* 44 (2007) S36-S52.

### Getting started

The program can be launched under MS Windows explorer by double clicking or can be opened in a command window. No installation is required but 3 files can be created in the current directory: "spectrum.dat", "result.dat" and "liste.dat". These files are overwritten each time the program is executed. The program operation is explained in the Tutorial\_TDCR07c.pdf file.