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1.8
True coincidence summing corrections - Available software codes

Tim Vidmar

IJS

Jozef Stefan Institute, Ljubljana,Slovenia

General purpose packages

- Written for large experiments in particle physics, medical physics, shielding applications, criticality calculations, etc
  - Mostly require programming, quite complex to use
  - Track various kinds of particles
  - Perform full Monte Carlo calculations
  - Two approaches to calculation
    - Spectra with and without coincidence effects
    - Only efficiencies calculated – separate package for coincidence effects required
  - Can handle arbitrary geometries – unusual objects
  - Run times between minutes and hours
  - Various sources of decay data
  - Not all of them simulate nuclear decay by default

General purpose packages

- MCNP – 40 years of development, no programming (input decks only), add-on for nuclear decay by A. Berlizov (MNCP-CP)
- GEANT3 - Fortran, geometry description in terms of volumes, no longer developed, decay add-on by Laedermann & Decombaz (Sch2for)
- GEANT4 – C++, general purpose, decay module included, developed at CERN, no input decks
- PENELOPE – Fortran, e^- and gamma, very precise interaction treatment, limited programming required, decay module under development
- EGS – Mortran, popular in medical community
- FLUKA – developed at CERN, Fortran, rather recent

Specialized codes

- Specifically aimed at gamma-ray spectrometry
- No programming, user friendly interfaces
- Various approaches
  - Full Monte Carlo (spectra available)
  - Experimental efficiencies required
  - Semi-deterministic approach
- Much quicker than general packages
- Limited geometry
- Usually the latest DDEP data
- **Not (yet) integrated with major manufacturer's platforms**

Specialized codes

- CORSUM – "grand daddy" of coincidence correction codes, tables of formulae available, X-rays also treated in later versions
- GESPECOR – developed in the 90's, commercial, widely used, also by NMIs, constant improvements, all major detector and sample types covered, abundant references, full Monte Carlo
- ETNA – requires user input of total efficiencies, direct link to the DDEP database, Andreev formulae
- TrueCoin – developed for IAEA, treatment of X-rays
- CCCC – semi-deterministic, runs in Excel, no measured efficiencies required, limited to coaxial detectors and cylindrical samples
- Your own code (using KORDATEN)?
- **Collaboration with the activation analysis community**

Major manufacturers

- CANBERRA – ISOCS and LABSOCS
  - All imaginable sample geometries and materials
  - Detector characterization required …
  - … or not?
  - Sufficient accuracy?
  - ENSDF data, X-ray effects included, validation study
- ORTEC – part of GammaVision
  - Based on the “third curve” of Blaauw
  - Calibration with a mixed sources required for each geometry

The choice is yours …

- Do I really need coincidence corrections?
- Am I willing to do some programming?
- Would I rather stick to major manufacturers' products?
- Do I work with an (semi)-automated analysis?
- Can I measure total efficiencies?
- How well do I know my detectors?
- **Is there not a simple, tested, one-fit-all solution?**