AN ELECTRON/PHOTON TRANSPORT BIBLIOGRAPHIC DATABASE

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ABSTRACT

This paper describes a bibliographic database now available to participants at this workshop and to other colleagues. I built this database on a PC using the commercial database program, "Lotus Approach"[1]. However, the information in it can also be displayed and manipulated using Microsoft Excel or programs such as Microsoft ACCESS, FileMaker Pro, etc. The database consists of over 4000 bibliographic references in the field of coupled electron/photon transport (covering the energy range 10 eV - 30 MeV) and its many applications in radiation physics. It was developed during the last ten years as an aid for writing a book on electron/photon transport. It is expected to be of use to workers in the many diverse fields involving x-rays, electron beams, or radioactive sources. A paper surveying electron/photon transport (and describing this book project) was given at the MC2005 conference in Chattanooga in 2005[2].

A partial list from the over-fifty topics (or subject categories) of the references in this database includes: (a) photon and electron cross section data; (b) electron multiple scattering and stopping power; (c) mathematical methods of transport, including Monte Carlo simulation, solution of the transport equation, semi-empirical models, and many others; (d) 3-D transport; (e) standard computer codes, such as PENELOPE, EGSnrc, MCNPX, GIANT4, etc.; (f) experimental and Monte Carlo data for electron backscatter, transmission, energy and charge deposition; (g) radiation therapy physics; (h) radiation treatment planning (including IMRT); (i) medical imaging; (j) radiation processing of materials; (k) theoretical and experimental dosimetry; (l) the radiation dose at material interfaces; (m) positron transport; (n) x-ray generation; (o) electron probe microanalysis; (p) x-ray fluorescence analysis; (q) x-ray photoelectron spectroscopy; (r) Auger electron spectroscopy; (s) secondary electron emission; (t) electron transport in insulators; (u) electron slowing down; (v) microdosimetry; (w) electron and ion track structure; and (x) electron spectroscopy areas, such as EELS, REELS and elastic peak electron spectroscopy (EPES).

The database will be distributed in two "formats": (1) a comma-delimited text file for importing into database programs, and (2) a Microsoft Excel or "xls" file. Files developed using Lotus Approach, which includes a "dbf" file, will also be available. The eight fields contained in each bibliographic reference record include: (1) a "reference name" [such as AHNESJO(2006), SALVAT(2004B)] derived from the first author's last name capitalized, the year of publication, and a letter A, B, C, … if there is more than one reference in the database for that year, (2) the year of publication, (3) the type of reference (journal article, report, conference paper, etc.), (4) an alphanumeric code for the subject category in which the reference has been placed, (5) a 5 – 15 word summary, (6) the citation (e.g., the journal reference), (7) the list of authors, and (8) the reference title.

This large bibliographic database is searchable and much more flexible than a bibliographic listing. Citations are given from over two hundred journals and literally thousands of authors. A few applications of the database include the following: (1) it can be used to search for articles of interest published in a particular journal, located, say, at a technical library. (2) It is useful for finding some recent publications or those published in any past year or range of years. (3) It can be used to generate text files and/or printed tabular bibliographies for each subject category, ordered, for example, by reference name, year of publication, or by journal title. (4) References can be "sifted out" by sorting or searching using various combinations of the publication year, journal, authors' names, and terms found in the reference titles or short summaries.

In the database, there are as many as 411 references in one of the subject categories (electron microprobe analysis or EPMA!) Typically there are around 40 - 100 references in each category. For simplicity, only one category was assigned to each reference, although many references could have been classified under several different categories. For example, the reference designated KEALL(1996C) entitled "Super-Monte Carlo: a 3-D electron-beam dose calculation algorithm" could have been categorized by (a) Monte Carlo, (b) 3-D transport, (c) electron beam energy deposition or (d) medical treatment planning. For people interested in exploring topics outside their specialty, this bibliographic database would be an educational reference tool. An important application would be to find sources of electron/photon transport data for validating theoretical models and computer algorithms.

This database is not in a tagged format such as employed by programs like EndNote, ProCite, Citation, etc. It would be advantageous to be able to use the powerful bibliographic capabilities of those programs. However there are now over 4000 references, so it would take some effort to convert them all to this format.

It is appropriate and timely to make this database available since it exists now (unlike the proposed book which is taking a long time to write.) I expect it to be useful to workers in many fields (in the case of this workshop - computational medical physics.) Data files will be distributed at this conference. It is expected that they will also be available via the Internet in the not-too-distant future.

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[1] **I unreservedly recommend the use of this readily available and easy-to-use program!**

[2] **J. C. Garth, "Electron/photon transport and its applications",** ***The Monte Carlo Method: Versatility Unbounded In A Dynamic Computing World*** **Chattanooga, Tennessee, April 17–21, 2005.**