Instruction of example input file for PHITS

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1. Supported PHITS version and tested platforms

Tetrahedral mesh geometry is supported by PHITS from version 2.88, and thus these input files can be used only in PHITS version 2.88 or later. It has been confirmed that PHITS version 3.33 can read the JPM and JPF phantom data and input example files for their implementing and calculate the doses without any problems. Therefore, we recommend using PHITS version 3.33 or later for dose calculations using JPM and JPF.

For the verification of dose calculation, etc. by using JPM and JPF, eX.computer RM7J-E222/B (Intel Core i7-12700, P8+E4 Cores / 20 Threads / P2.1+E1.6GHz, Max Turbo Frequency 4.9GHz) was used as the tested platform.

2. How to implement of JPM and JPF to PHITS, and how to run?

1) If you install PHITS using the installer included in the package, the path to install PHITS (file(1)) and the paths to the nuclear data files (file(7), file(14), file(20)) are automatically set. In that case, you do not need to set these paths.
2) On the other hand, if you want to customize the paths for your computer platform, uncomment the file(1), file(7), file(14), and file(20) options in the input example file (delete the "$" before them), and set the path to install PHITS and the paths to the nuclear data files. The path to install PHITS is specified with the file(1) option. The file(7), file(14), and file(20) options should be set to the paths to the "xsdir.jnd" file (nuclear data), the "trxcrd.dat" file (photon decay-data library), and the "egs" folder (library data for EGS5), respectively.
3) How to run the example input files (with ELE- and NODE-format files).
   - Linux/MacOS : After launch "Terminal", change the directory on the screen to the location of the input file, and type as follow.
     phits.sh [input file name]
   - Window : Place the mouse cursor over the example input file, right click, select "send to" from the menu, then select "phits" from the menu.

It should be noted that the example input files import ELE- and NODE-formats phantom data, which a specified on Line 5 of the "JPM.cell" or "JPF.cell" files.

4) How to run the example input files using the Tetra.bin file (BINARY-format)

- Importing phantom data written in BINARY format (Tetra.bin; The file name is fixed and cannot be changed.) instead of ELE- and NODE-format files can significantly reduce the load time. This can be done by changing the "itetra" option (Line 20) in the [Parameters] section. In the original example input files, the "itetra" option is set to 0 as the default value.
- "itetra" option = 0: The phantom data file written in ELE- and NODE-formats, which is specified in the [Cell] section, is imported.
- "itetra" option = 1: The phantom data file written in ELE- and NODE- formats is converted to binary format. As a result, "Tetra.bin" file is generated.
- "itetra" option = 2: The phantom data file (Tetra.bin) written in binary format is imported.

3. Output and result files

After the run is finished, you can get output and result files, and among them, result file contains calculated doses. The name of output and result files can be defined in input files by "file(6)" option (Line 22) and "file" parameter in tally (external: Lines 78 and 99 / internal: Lines 83 and 104), respectively. The examples of output and result files are given in result folders in each of "External" and "Internal" folders.