Comparison of MCNP calculation result between THOR and modified source file

Jia-Cheng Lee
Department Oncology, Taipei Veterans General Hospital, Taipei, Taiwan
Email: happyken176@gmail.com

Sang -Hue Yen
Department Oncology, Taipei Municipal Wan-fang Hospital, Taipei, Taiwan

Lin-Wei Wang
Department Oncology, Taipei Veterans General Hospital, Taipei, Taiwan

Introduction
There are many treatment planning system for BNCT such as JCDS, SERA, NCTPlan, Tsukuba plan, and THORplan. Four source files including thermal neutron file, epithermal neutron file, fast neutron file, and gamma file were needed for THORplan in order to get more accurately results. But the lacks were time consuming and difficultly use for the other TPS.

Materials and Methods
We want to modify the four source file to one or two file for SERA or NCTplan and decrease the bin number from about one hundred bins to ~10 bins so that could calculate treatment plan for one patient within 30 minutes. We compare the results of flux with and without collimator and show the dose results of neutron and gamma with collimator. Two kind of input were calculated by MCNP code in 30x30x30 water tank.

Results
The differences of gamma flux between THORplan input file and modified input file were small than 5% within 11 cm water depth. In total neutron flux, within 15 cm, the differences of total neutron flux between THORplan input file and modified input file were small than 5%.

Conclusion
We compared the flux and dose components between two source file (THOR and simplified). The differences of neutron and gamma flux without collimator were smaller than 3% within AD. The differences of neutron and gamma dose with collimator were smaller than 4% and 3% within AD, respectivel. In all dose components, dose differences between THOR and simplified source file with collimator were smaller than 5% within AD. The calculated neutron & photon flux and the dose components agreed well (within 5%) with each other.