

E394

PROPOSAL FOR EXPERIMENT AT RCNP

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TITLE:

Hadron Therapy related Data base and detector development

SPOKESPERSON:

Full Name: Augustine Ei-fong Chen
 Institution: Department of physics, National Central University
 Title: Professor
 Address: Dept of Physics, National Central University, Chung-li, 320 Taiwan
 Phone: +886-3-422-7151 ext 65350
 FAX: +886-3-422-8991
 E-mail: t220042@ncu.edu.tw

EXPERIMENTAL GROUP:

A. E. Chen	Department of Physics, National Central University	P
S.Y. Cai	Department of Physics, National Central University	RA
P.R. Tsai	Department of Physics, National Central University	RA
Y.W. Tsai	Department of Physics, National Central University	RA
P.K. Teng	Institute of Physics, Academia Sinica	P
M.L. Chu	Institute of Physics, Academia Sinica	P
C.H. Lin	Institute of Physics, Academia Sinica	AP
F.X. Chang	Institute of Physics, Academia Sinica	RA
C.H. Wang	Electro-Optical Engineering Department, National United University	P
C.J. Tung	Department of Medical Imaging & Radiological Sciences Chang Gung University	P
T.C. Chao	Department of Medical Imaging & Radiological Sciences Chang Gung University	AP
C.C. Lee	Department of Medical Imaging & Radiological Sciences Chang Gung University	AP
S.J. Dai	Department of Medical Imaging & Radiological Sciences Chang Gung University	RA
T.S. Duh	Institute of Nuclear Energy Research	AP
C.H. Lee	Institute of Nuclear Energy Research	AP
M.C. Yuan	Institute of Nuclear Energy Research	AP
C.W. Hsieh	Department of Electrical Engineer, National Chia-Yi University	AP

RUNNING TIME: 2days each run, need one run in March and the other run in June

Installation time without beam 3/4 days

Data runs 1 1/4 days

(need several accesses to replace detectors and change beam parameters)

BEAM LINE: ??

BEAM REQUIREMENTS:

Type of particle proton

Beam energy 400 / 230 / 160 / 100 MeV

Energy resolution < 0.2 MeV

Beam intensity < 10 nA

Beam dimension FWHM ~ 2 mm/ 10 mm / 60 mm in diameter

BUDGET: 0 yen

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SUMMARY OF THE PROPOSAL

Recent advances in cancer hadron therapy have imposed strong and urgent demands of suitable detectors for Quality Assurances (QA). We design the following detectors to meet such demands. Detectors designed and built are 1) Multi Layer Faraday Cup (MLFC) for range measurement, 2) Multi Layer Ionization Chamber (MLIC) for dose development in depth and 3) 2D pad or 1D double-side strip Ionization Chambers (2D IC) for lateral position measurement.

From clinical point of view, accuracy of simulation is equally important in treatment planning, which requires reliable data base. GEANT4 is one of the general accepted simulation codes in hadron therapy, which was originally developed in HEP community and later extended to hadron therapy. Detail of its data base needs verification and improvement. To collect these data adequate detectors are needed.

Purposes of this experiment are:

- 1) To verify detectors (MLFC, MLIC and 2D detectors) meet their design goals, in particular they must meet clinic environment.
- 2) To perform relative calibrations of each detectors.
- 3) To verify GEANT4 simulation results or to collect data for improvement of simulation.