

Accelerators in Medicine

Nikoloz Tchikadze

Masters 1st year student

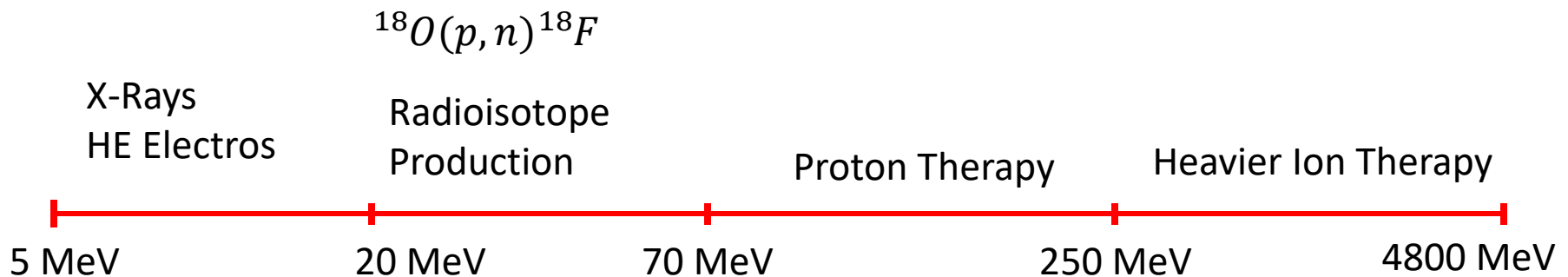
Tbilisi State University



Bezmiechowa Górna, Bieszczady mountains, Poland

July 11- July 20, 2024

Accelerator Applications in Medicine



Linear Accelerator



Cyclotron



Synchrotron

Motivation

Georgia is expecting cyclotron

- Focus: Radiotherapy

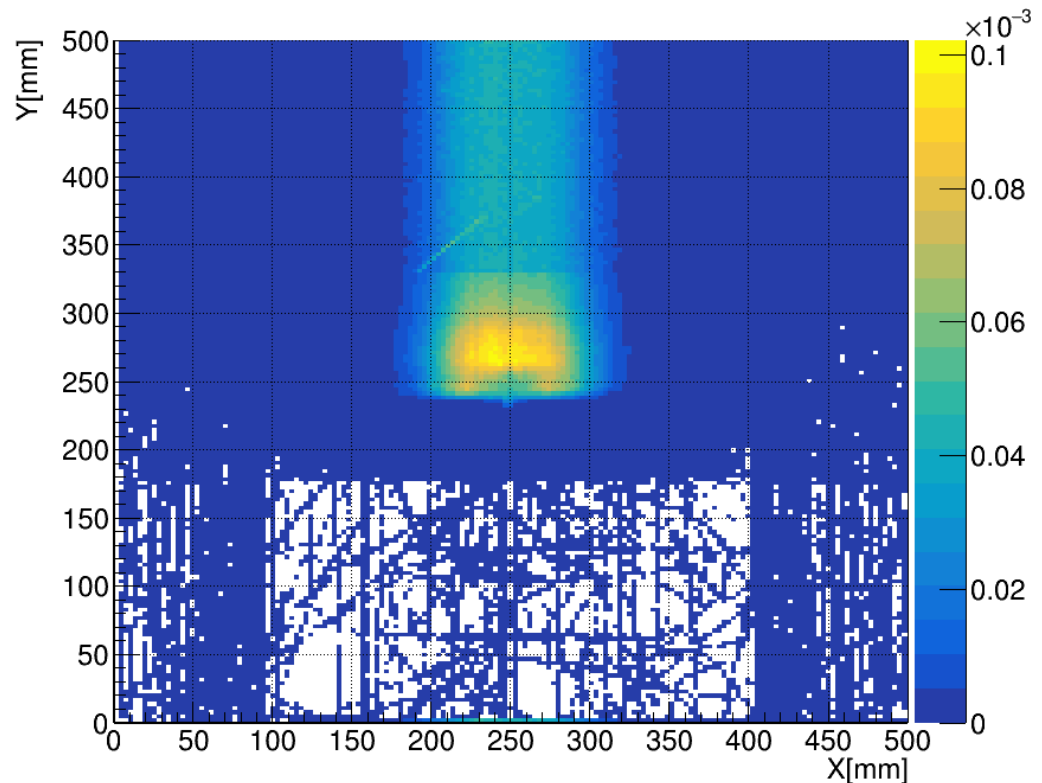


Cyclotron for Kutaisi (Georgia)

First Plan, then Irradiate

First simulate irradiation
and Calculate the dose

Then Patients are
irradiated following the
plan



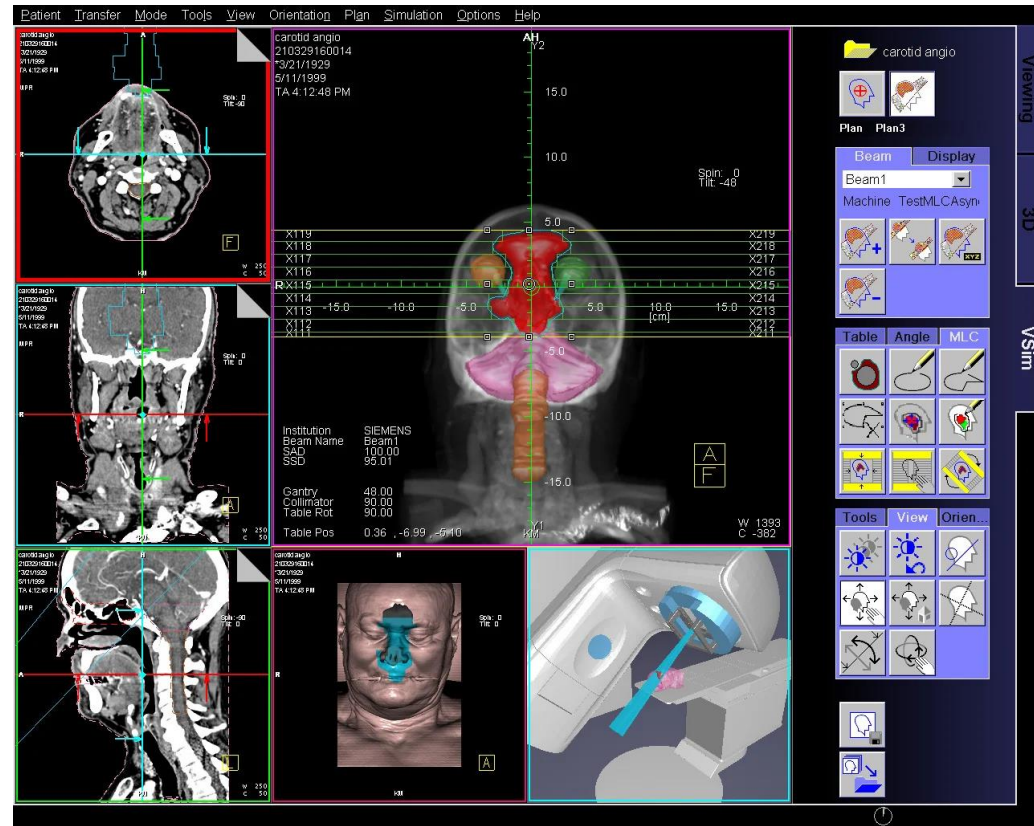
Dose calculation done with Geant4

TPS-Treatment Planning System

TPS is a software used for creating Treatment Plans

Relies on analytical calculations with approximations

- I CT-Scan
- II Planning the Treatment
- III Irradiating the patient



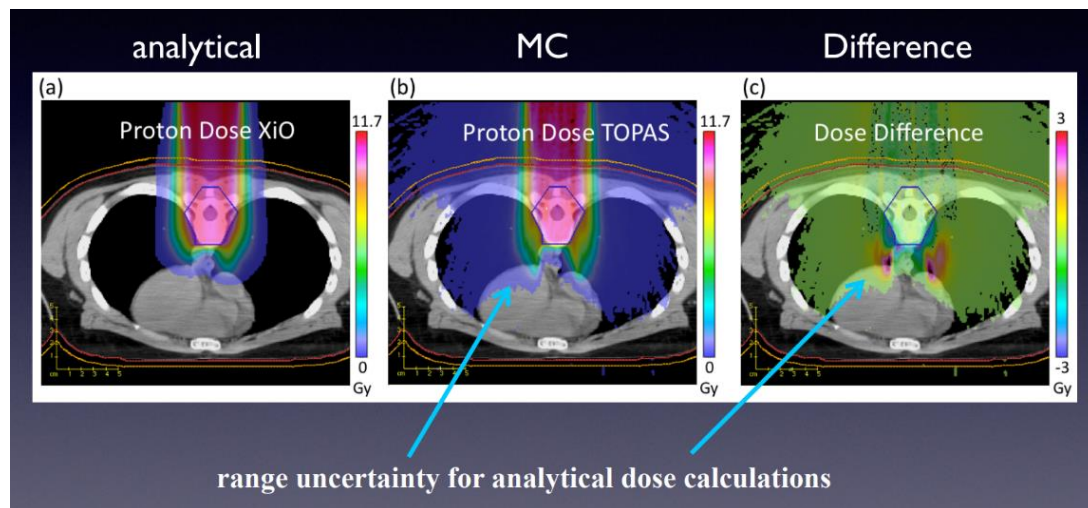
TPS VS Monte Carlo



- Free, Accurate, customizable
- Requires long time

Commercial TPS

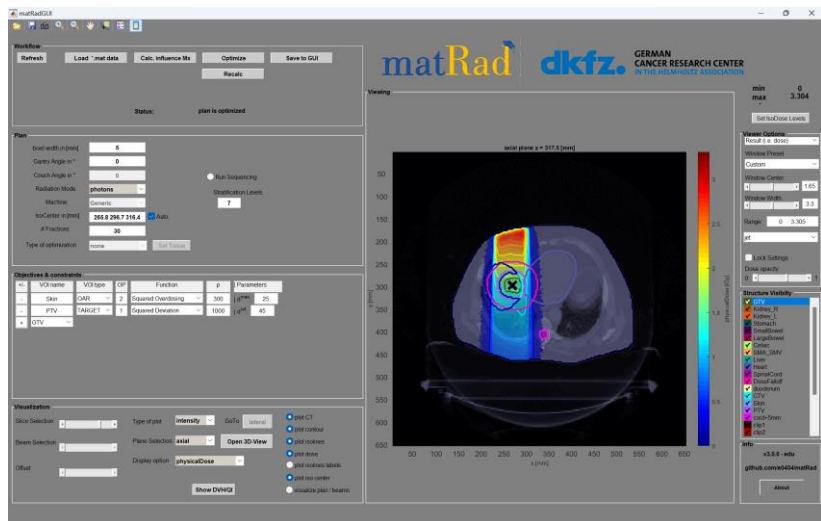
- Fast
- Expensive, not known accuracy, not customizable



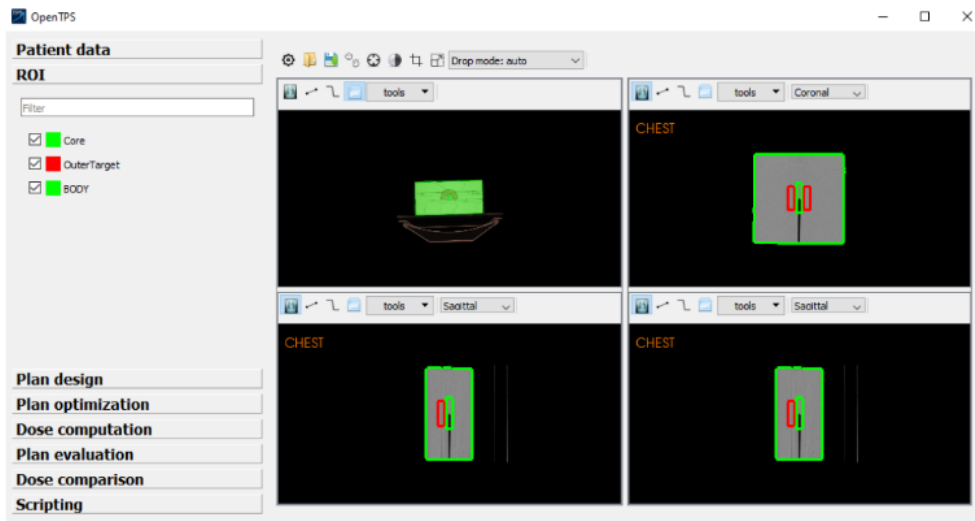
Open source TPS

- Free, customizable, Fast
- No certification, not known accuracy

matRad



OpenTPS

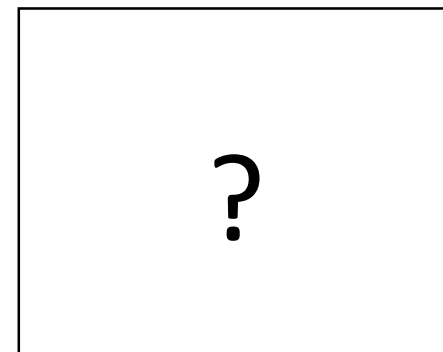
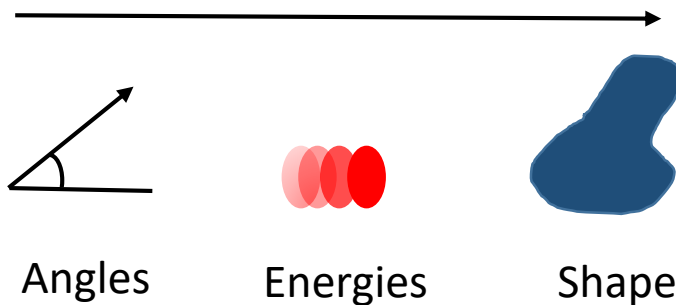
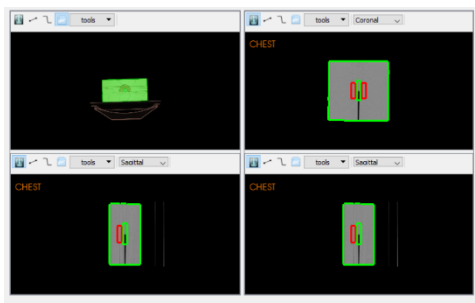


OpenTPS vs Geant4

Starting this summer, I will compare OpenTPS with Geant4

OpenTPS

GEANT4
A SIMULATION TOOLKIT

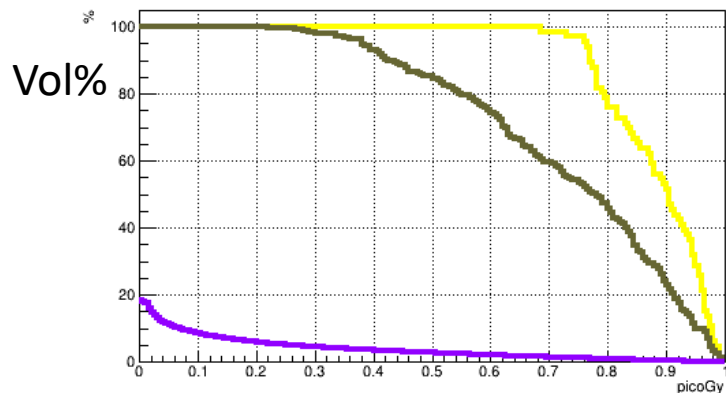
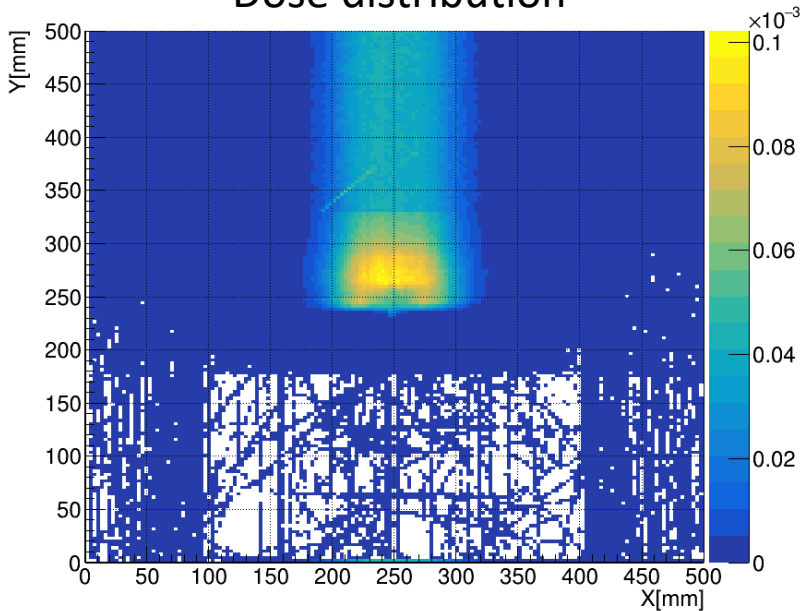


Thank You



MatRad to Geant4

Dose distribution



MatRad DVH

Dose(Gy)

Densities of the body

