TARC Analysis using Geant4 and ADS at BARC

Abhijit Bhattacharyya

Bhabha Atomic Research Center
Mumbai INDIA

July 8, 2018

Outline

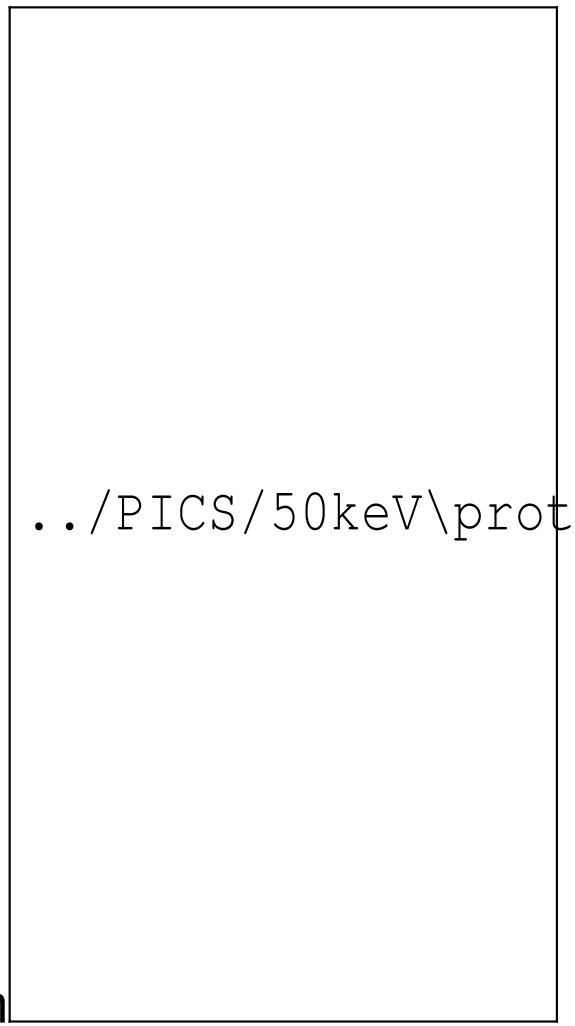
Idea for Indian ADS

Figure: Basic scheme to burn Thorium with ADS.

Fuel fraction

Figure: Consumption of fuel.

50keV Ion Source :: ADS BARC INDIA



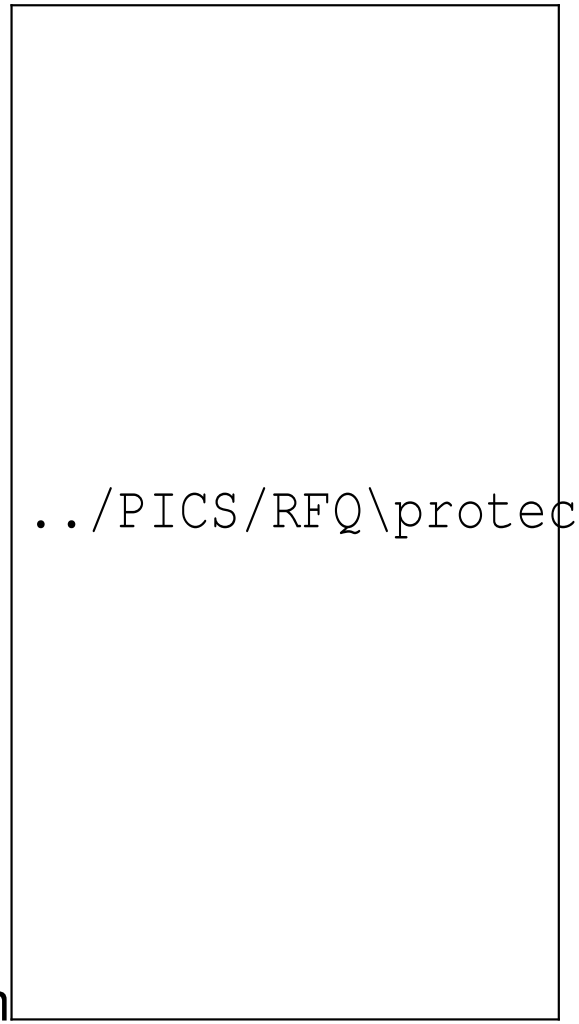
■_Ion■_Source.png m

Figure: 50 keV Ion source

ADS Target Testing Facility :: ADS BARC INDIA

Figure: ADS Target testing Facility

RFQ Assembly with RF coupler and bending magnets :: ADS BARC INDIA



Assemblywith RFcouplerbendingmagnet.png m

Distribution of Neutron Energy Deposition

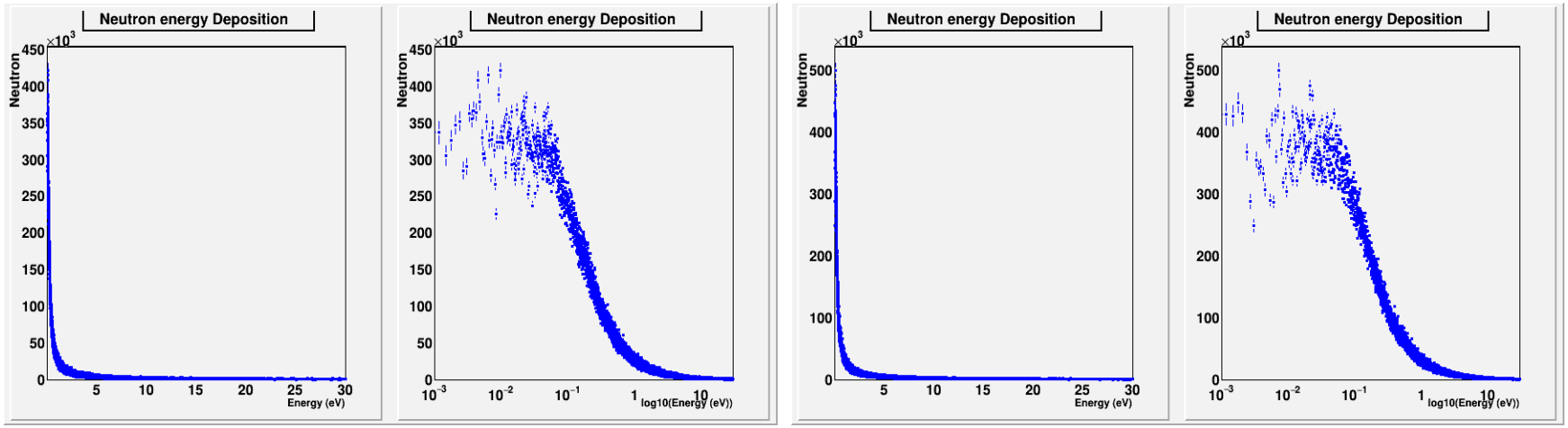
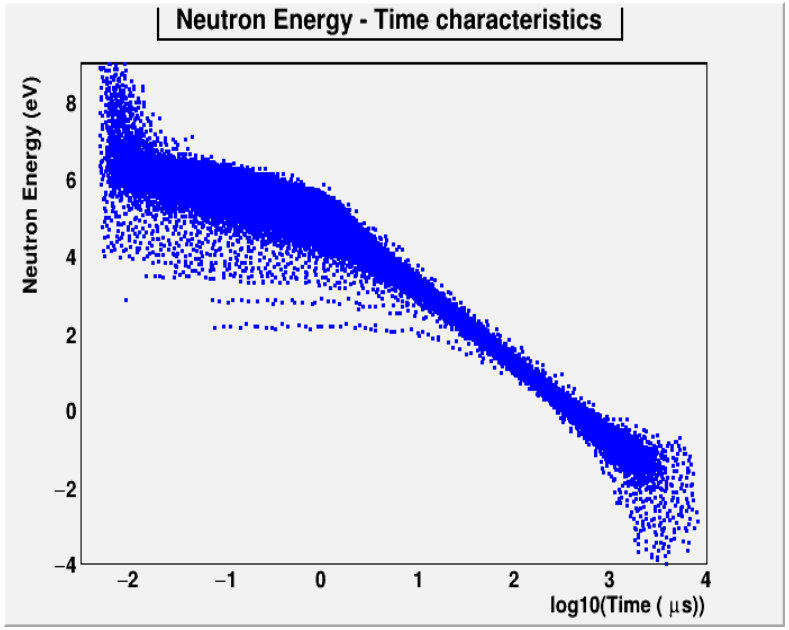


Figure: Neutron Energy deposition for *QGSPBICHP* and *QGSPBERTHP* Physics model.

Distribution of Neutron Energy and Times



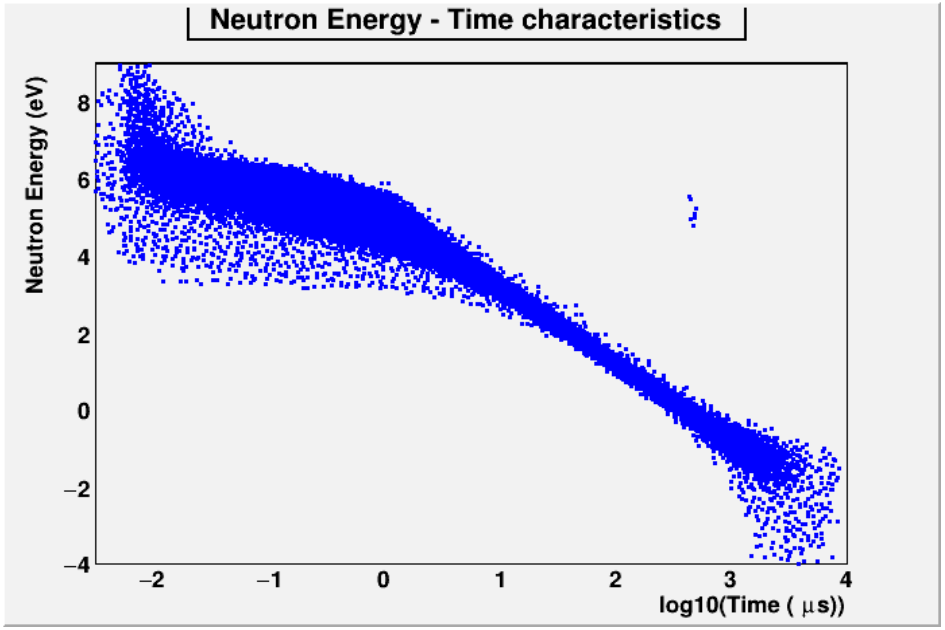
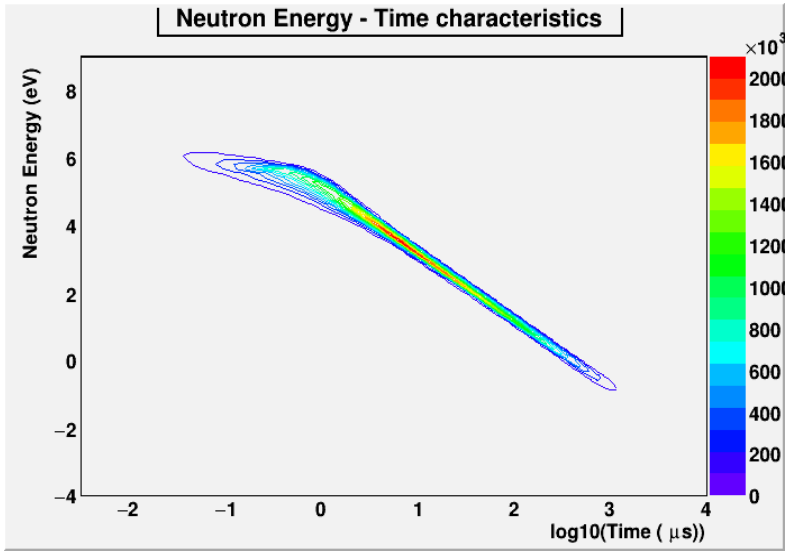


Figure: Distribution of Neutron energies and times using *QGSPBICHP* and *QGSPBERTHP* physics model.

Distribution of Neutron Energy and Times



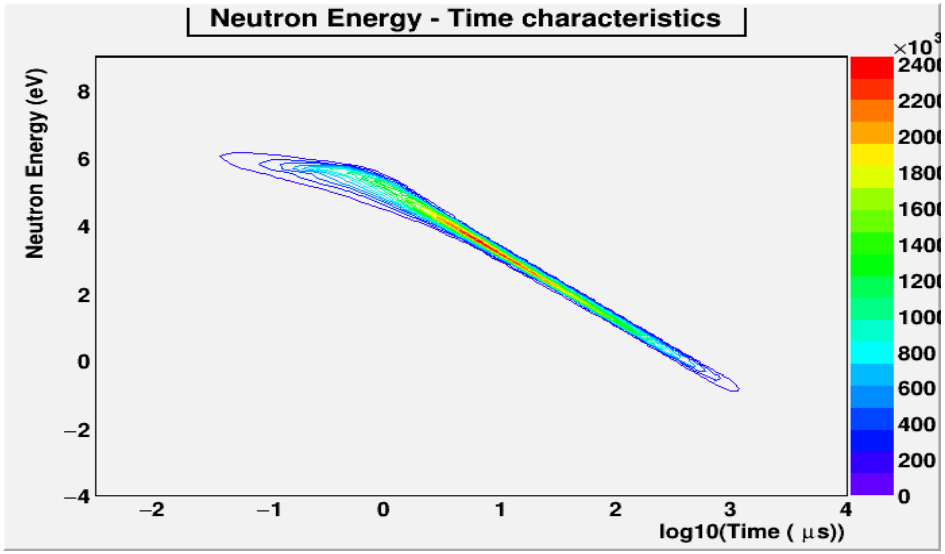


Figure: Distribution of Neutron energies and times using *QGSPBICHP* and *QGSPBERTHP* physics model.

Correlation of Neutron Energy and Times

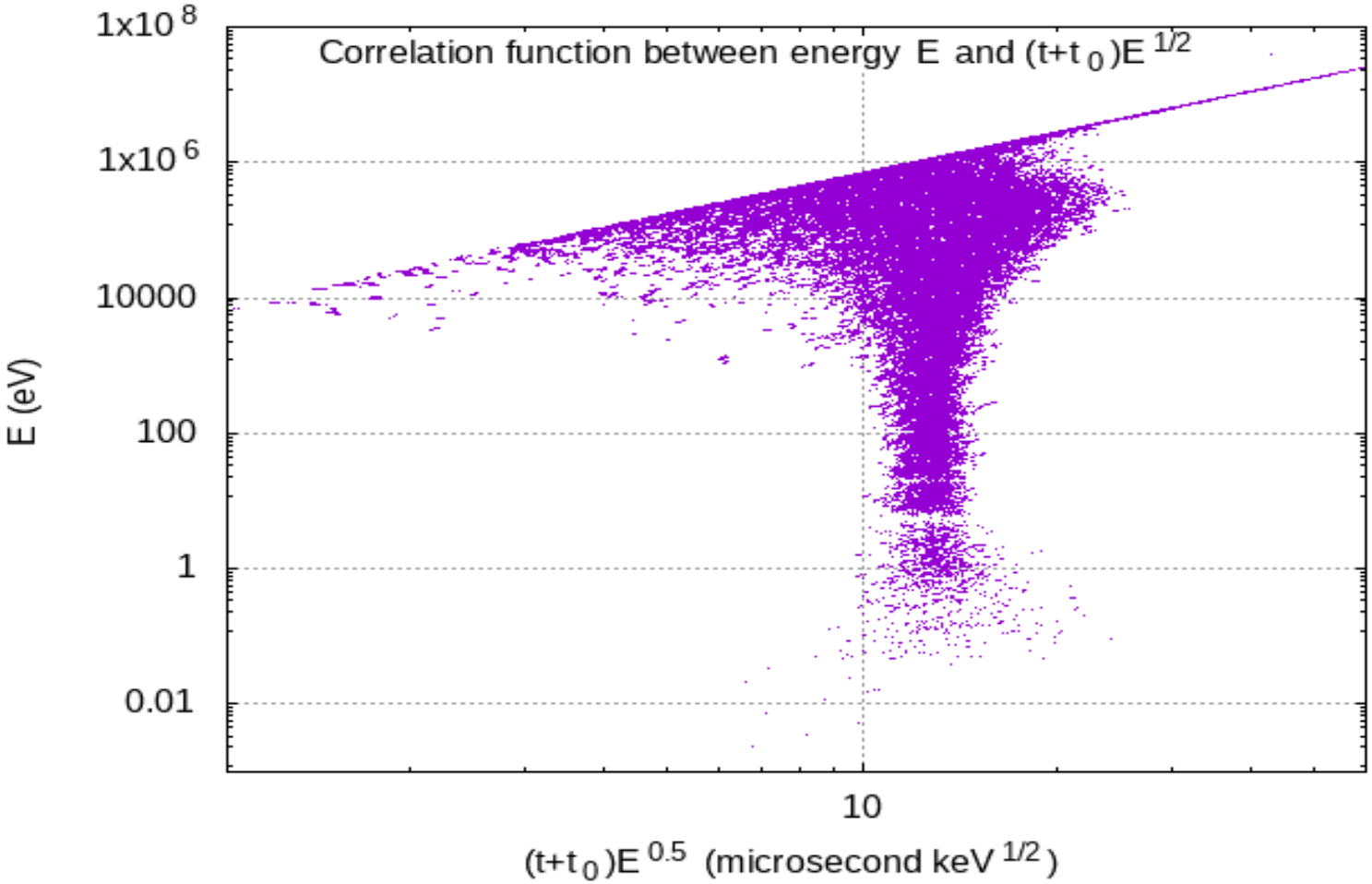


Figure: Correlation between neutron energy $E(eV)$ and $(t+t_0)\sqrt{E}$ using *QGSPBERTHP* physics model. Here $t_0 \approx 0.37\ \mu s$.

Distribution of Other Particles Energy and Times

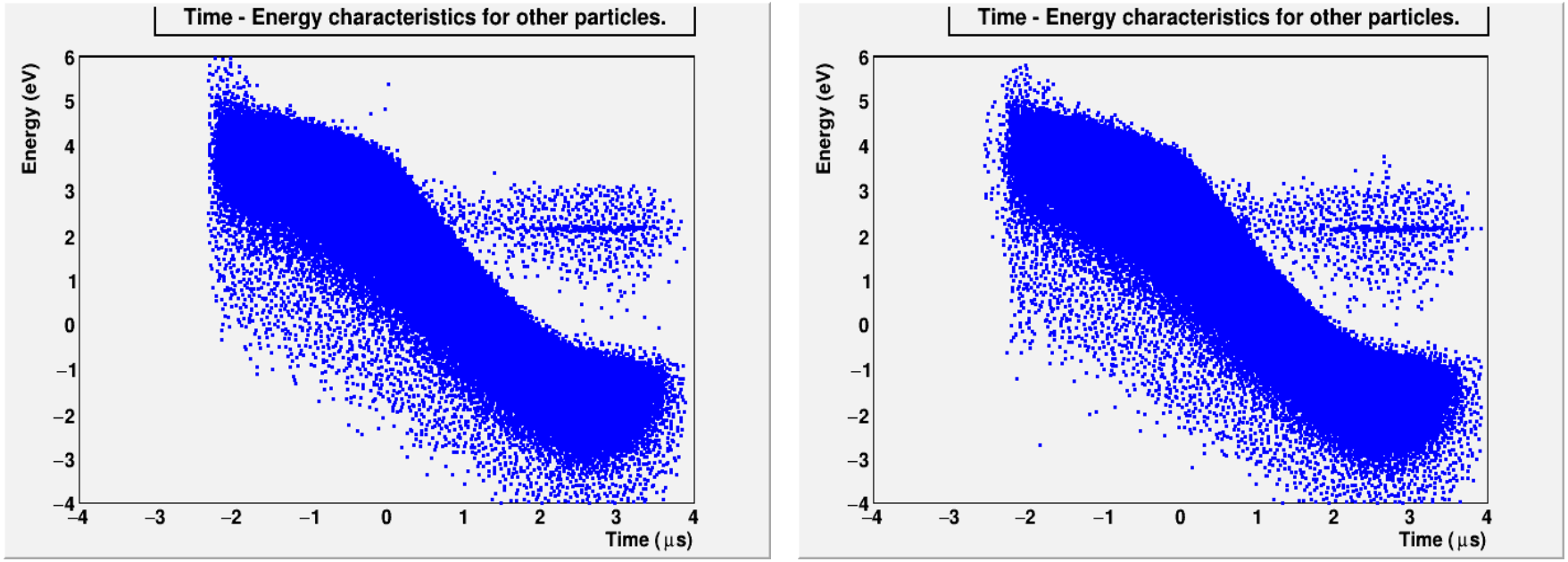


Figure: Distribution of other particles energies and times using *QGSPBICHP* and *QGSPBERTHP* physics model.

Distribution of Other Particles Energy and Times

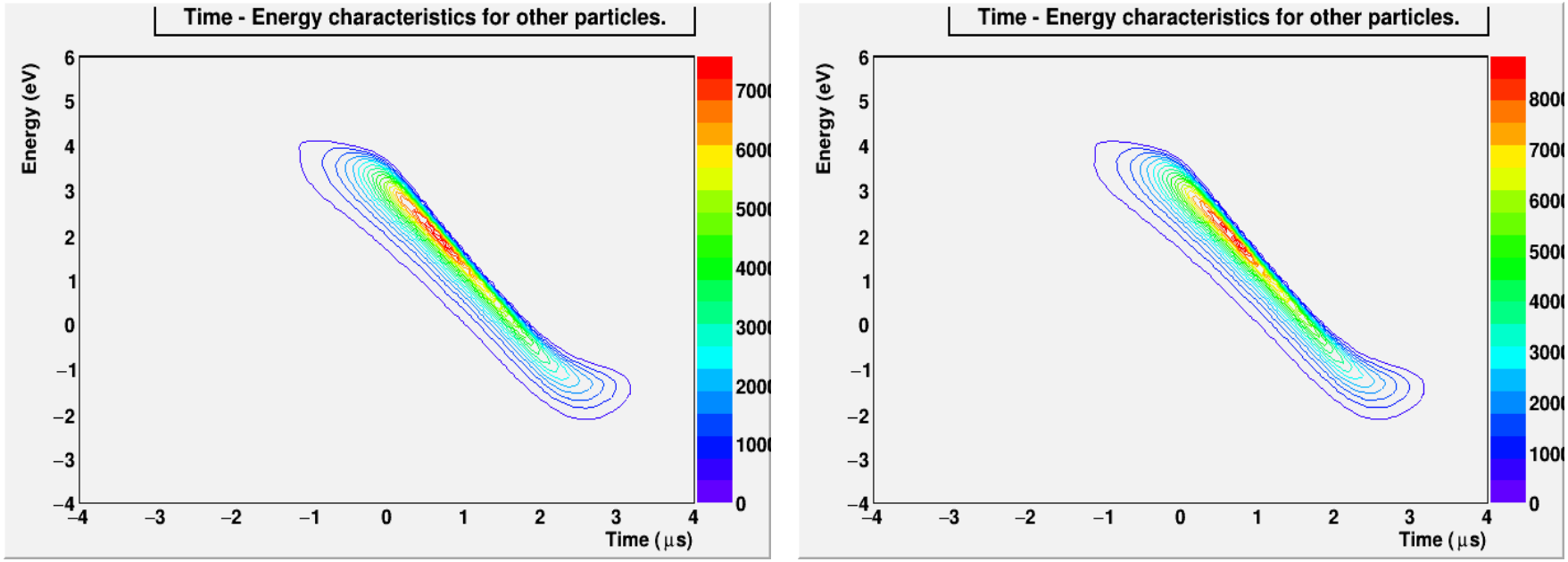
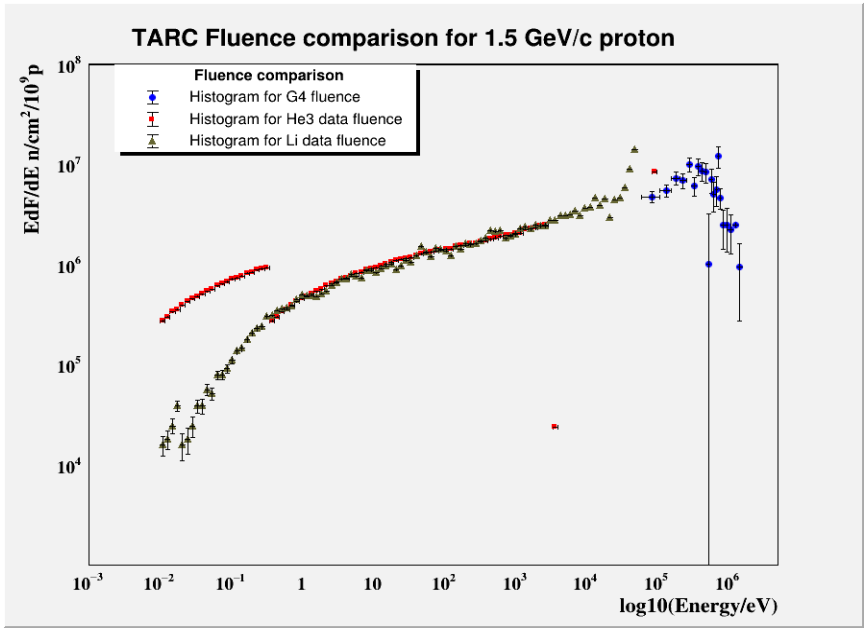


Figure: Distribution of other particles energies and times using *QGSPBICHP* and *QGSPBERTHP* physics model.

Distribution of fluence against energy



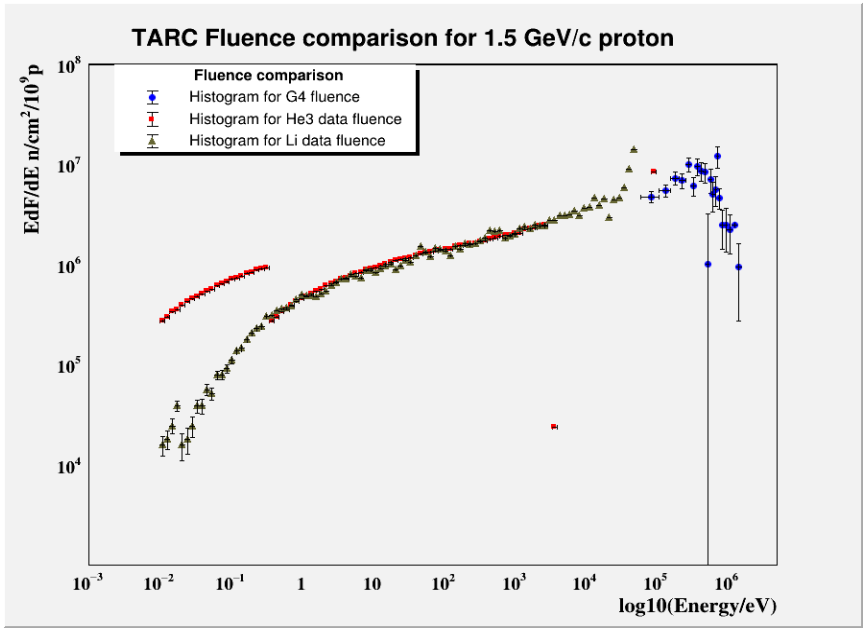


Figure: Distribution of fluence against energy for *QGSPBICHP* and *QGSPBERTHP* physics models.

Distribution of fluence at different radial distance away from the centre.

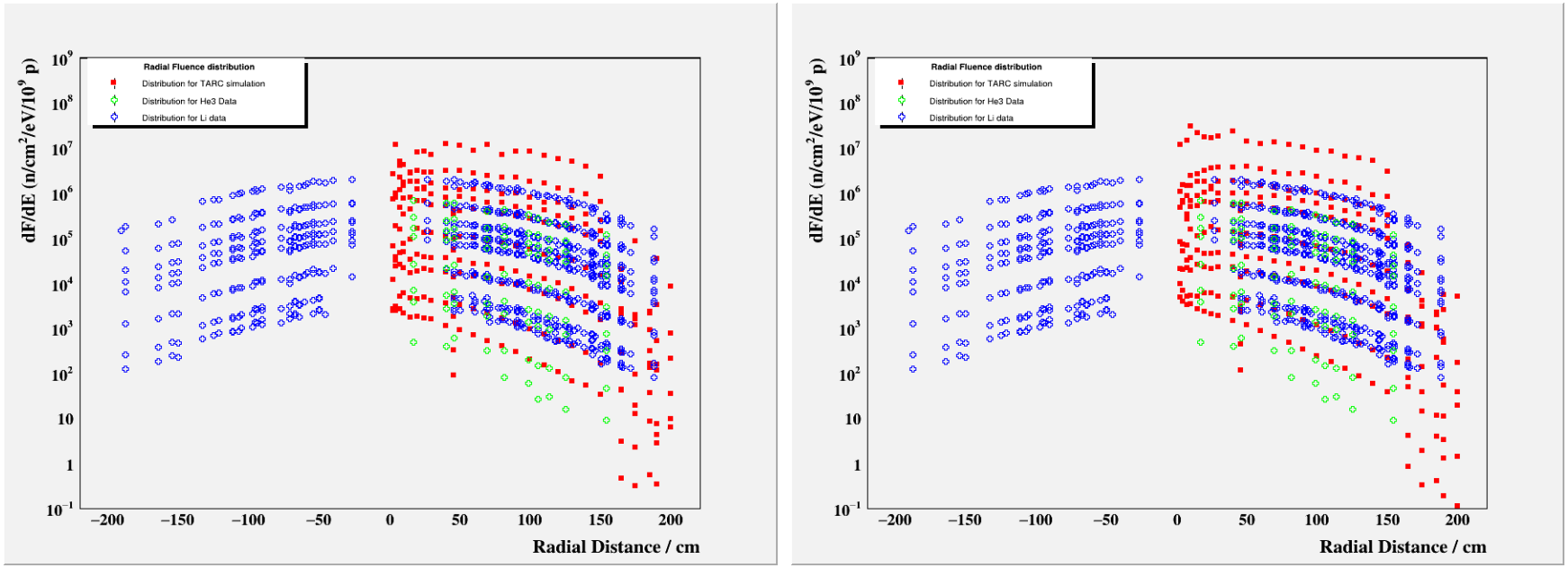


Figure: Distribution of fluence against radial distance from the centre using *QGSPBICHP* and *QGSPBERTHP* physics models.

Distribution of Ratio of fluence from Geant4 simulation and TARC experimental data

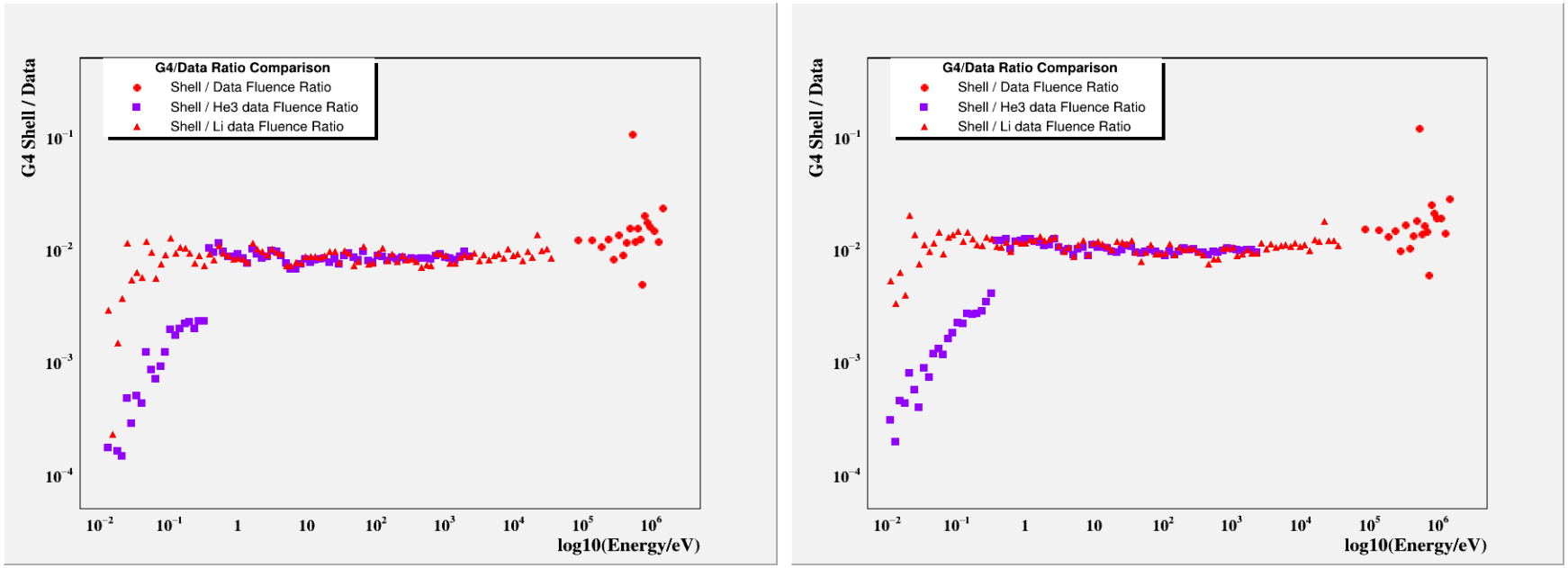


Figure: Distribution of ratio of fluence obtained from Geant4 simulation to experimental data using *QGSPBICHP* and *QGSPBERTHP* physics models.