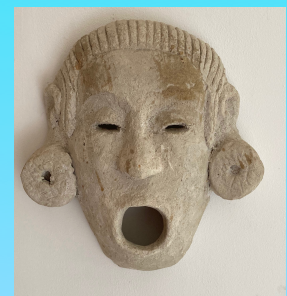
Computing:
Progress and plans

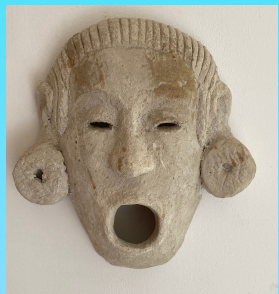


Requirements

Model of the accelerator	G4BL or BDSim
Flux creation	nuSim
Neutrino Event Generator	Genie or …..
Model of the detector	GEANT4 technology and physics

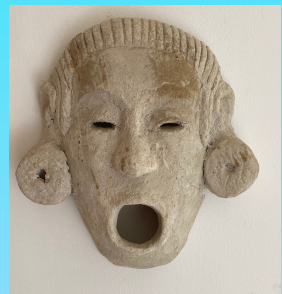
Need to create a data flow through this chain

…. paper end of the year



Status

Four CERN summer students supervised by
Anna Holm; Ken Long; Paul Kyberd; Jaroslaw Pasternak



Status

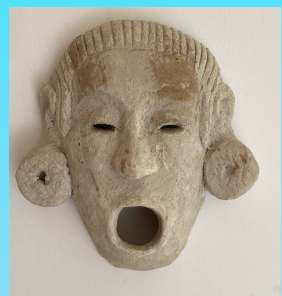
Accelerator:

Jaroslaw and students working on a model of the pion transfer line

Beam line transporting pions from the target to the nuSTORM ring has been studied in G4BeamLine and recently its model has been created in the BDSIM code.

The problem of matching has been identified and is under study.

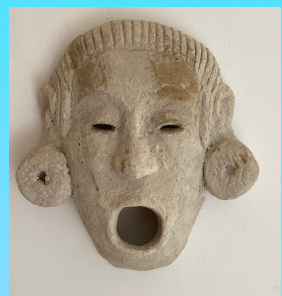
The ultimate aim is to track pions all the way to the end of the production straight and simulate the formation of the muon beam, which is needed to perform overall normalization of the neutrino flux ppt.



Status

nuSim:

Ken and Omar Ibna Nazim extended the model from decays just for the first pass through the production straight to multiple passes, and studying backgrounds produced in the arcs. (talk by Omar)



Status: pion flash

Paul and Sittha Jeamburaset work on the acceptance of the nuStorm ring to pion decays … using plots from the paper by Lagrange et al.

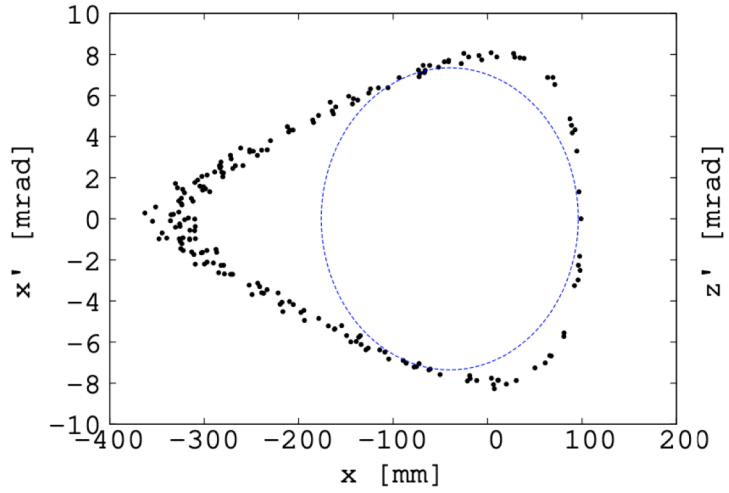


Figure 6: Stable motion in the horizontal Poincare map for maximum initial amplitude over 100 turns for p_0 in JBT. The ellipse shows a 1 mm.rad unnormalized emittance.

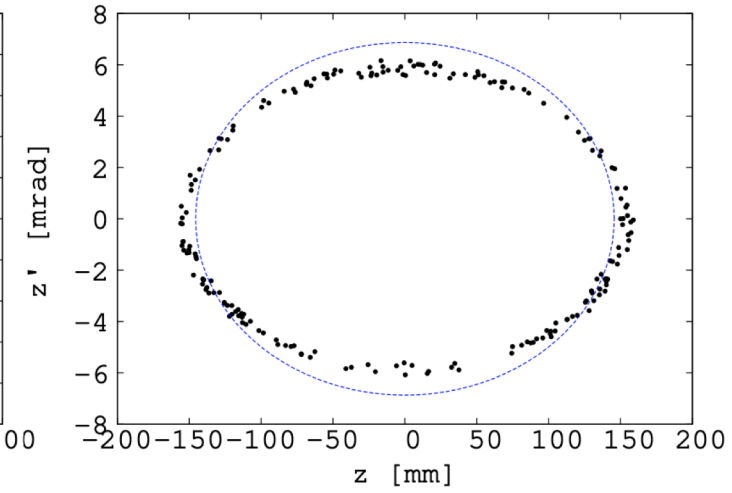
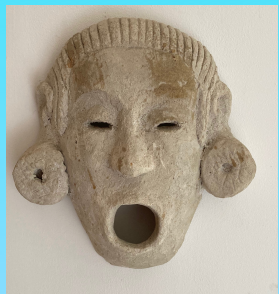
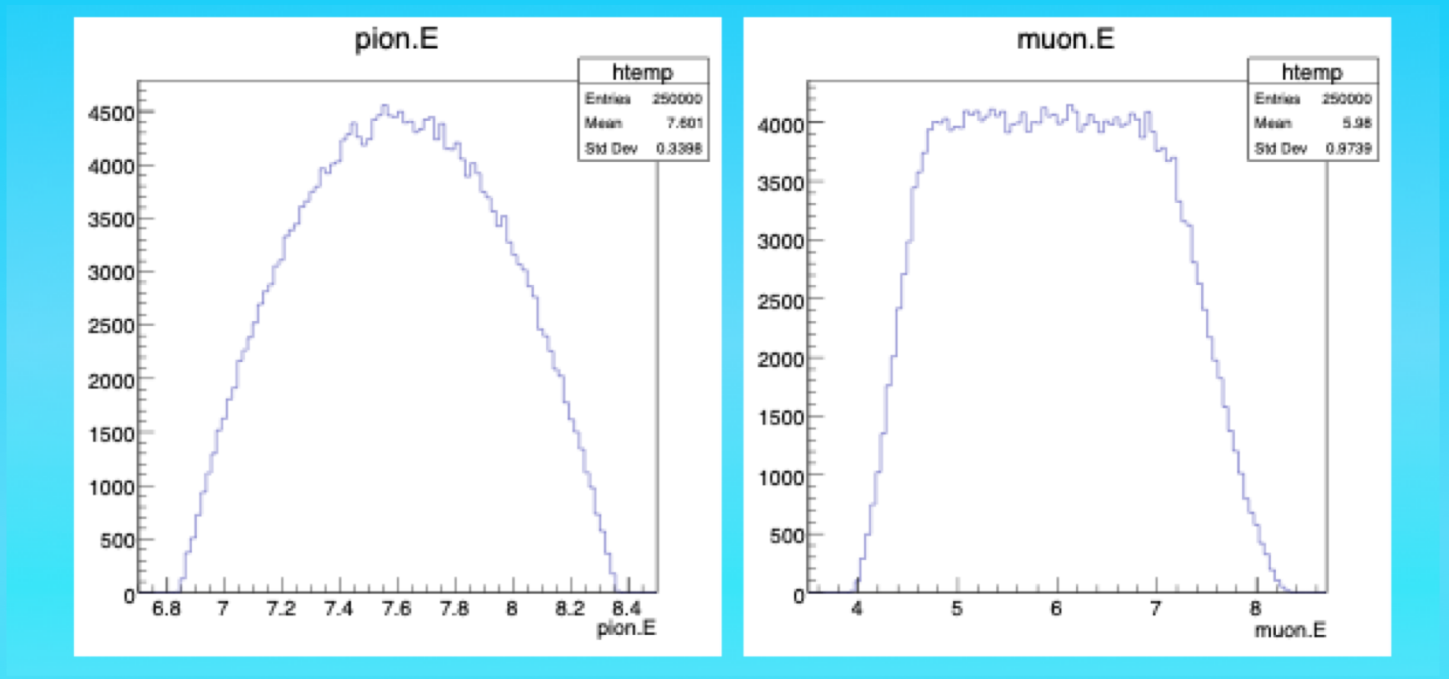


Figure 7: Stable motion in the vertical Poincare map for maximum initial amplitude over 100 turns for p_0 in JBT. The ellipse shows a 1 mm.rad unnormalized emittance.

Racetrack FFAG muon decay ring for nuSTORM with triplet focusing
J.-B. Lagrange et al

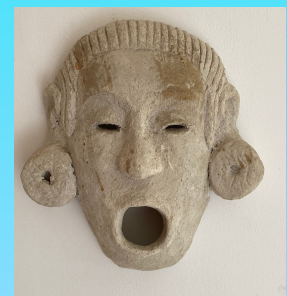


Pion Flash

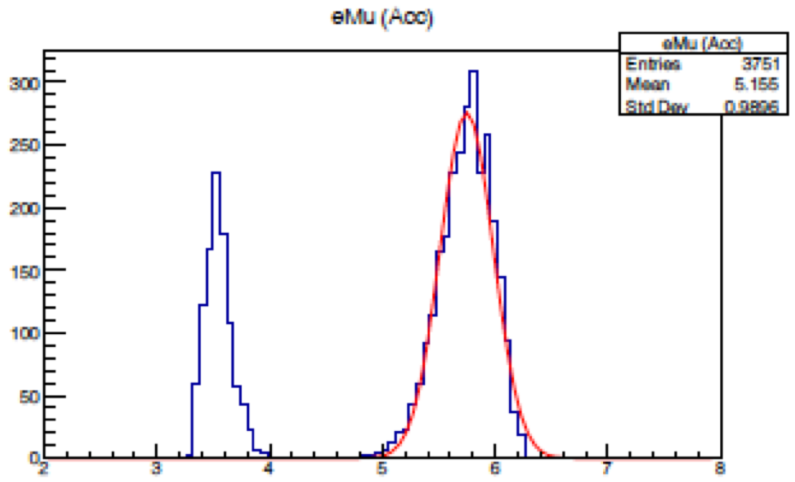


A suitable pion distribution gives a wide muon spectrum at production.

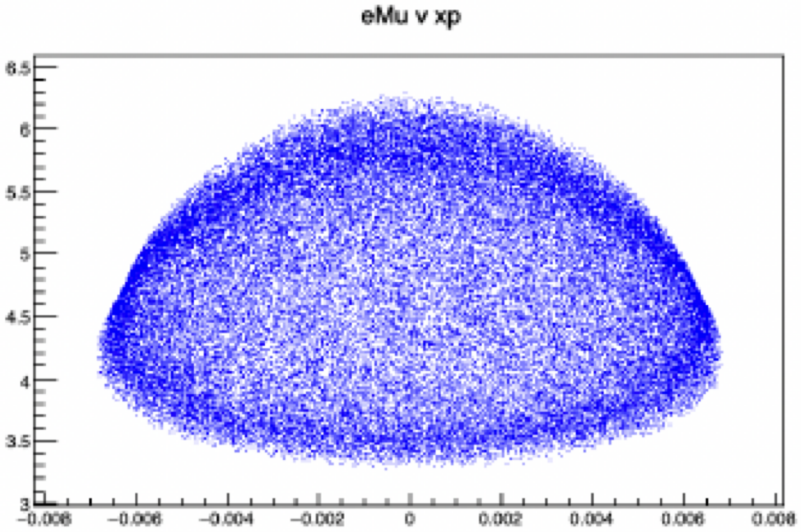
What does that mean in terms of muons which lie in the machine acceptance?



Pion Flash



(a) E = 6 GeV

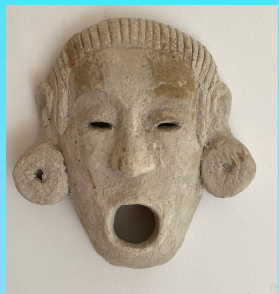


(b) E = 6 GeV

Mean energy is $5.74 \pm 4.0\%$ GeV.

From a wide distribution with a flat top, we get two peaks corresponding to the forward and backward going muons.

Intermediate energies are lost sideways.

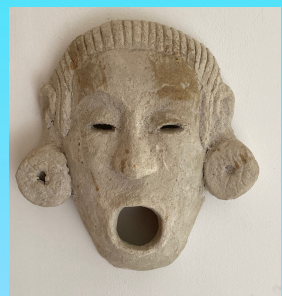


Pion Flash

Beam Energy (GeV)	Mean Energy (GeV) ± Width (%)	eff(%)
1.5	1.51 ± 4.7%	0.4%
2.0	2.00 ± 4.9%	0.6%
3.0	2.98 ± 4.9%	1.2%
4.0	3.94 ± 4.6%	2.5%
5.0	4.87 ± 4.8%	5.1%
6.0	5.76 ± 5.4%	5.4%
6.5	6.18 ± 5.8%	8.8%
7.0	6.61 ± 5.9%	11%
7.5	6.97 ± 6.6%	13%
8.0	7.39 ± 7.1%	15%

Preliminary

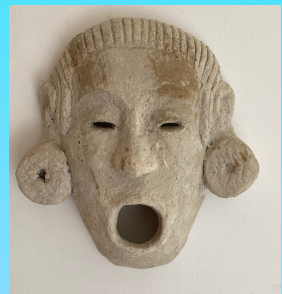
Emittance and Beta of the produced beam … still checking values



Status: Normalisatiom

Sittha Using NUMI data for protons on target to π's and including normalization in the information

Very preliminary but importantly solving the problem of carrying the normalization through the simulation chain



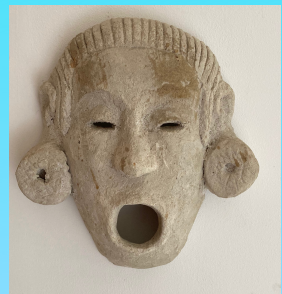
Status

Neutrino interactions – Genie:

Steve Boyd (See talk for details.

Has produced a Genie data set using information from nuSim)

Start of the work on definition of the detector requirements

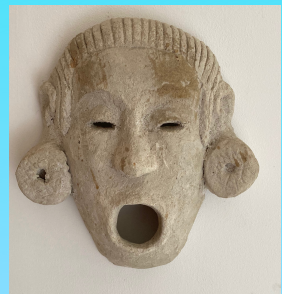


Status

Geant4:

Anna and Hitoshi Baba (see talk by Hitoshi) produced a geometric and material description of a Minerva like detector – stacked triangles of scintillator and iron plates.

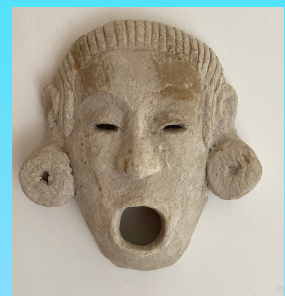
Needs to be made available in the repository



Meetings

09 August:

Timing/injection	Parameters for injection scheme	Postponed
Normalisation	Structure integrated into flux production	In progress
BDSim/G4BL	Simple model of a component	Done
Genie	Generate a dataset	Done
Geant4	Model of a detector component	Done



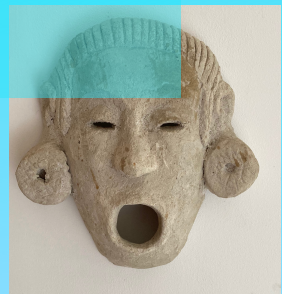
Meetings

13 September:

Identify channel to study

G4BL	Generate a beam profile
nuSim	Get electron and muon neutrino spectra for multi-turn simulation (normalized)
Genie	Generate a dataset for a channel based on ν_e and ν_μ
Geant4	Simulate (normalized) events based on Genie events

continue tying together the elements of the chain



Future Meetings

25 October: Simulation of a channel

Resolution of detector required for channel

06 December: