



# Experimental Physics List QBBC

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# Motivation

- ▶ Shower shape problem requires experimental Physics List for exercises, which do not effect LHEP, QGSP...
- ▶ An attempt to create Physics Lists free of LHEP components
  - LHEP is a part of all 20 PhysicsLists
- ▶ Exercise different ways of configuration
- ▶ Exercise new models

# QBBC Default

- ▶ QGSC for high energy:  $p, n, \pi^\pm$
- ▶ FTFC for  $K^\pm, pbar, nbar$
- ▶ LHEP for the rest
- ▶ Binary for  $p, n$
- ▶ Bertini for  $\pi^\pm, K^\pm, \Lambda, \Sigma$
- ▶ CHIPS for  $pbar, nbar, \dots$

# QBBC, verbose = 1

## Hadronic Processes for anti\_neutron

hElastic	Models:	elastic	Emin(GeV)=	0	Emax(GeV)=	100000
hInelastic	Models:	FTF	Emin(GeV)=	8	Emax(GeV)=	100000
		CHIPS	Emin(GeV)=	0	Emax(GeV)=	10

## Hadronic Processes for anti\_proton

hElastic	Models:	elastic	Emin(GeV)=	0	Emax(GeV)=	100000
hInelastic	Models:	FTF	Emin(GeV)=	8	Emax(GeV)=	100000
		CHIPS	Emin(GeV)=	0	Emax(GeV)=	10

## Hadronic Processes for kaon+

hElastic	Models:	elastic	Emin(GeV)=	0	Emax(GeV)=	100000
hInelastic	Models:	QGS	Emin(GeV)=	8	Emax(GeV)=	100000
		Bertini	Emin(GeV)=	0	Emax(GeV)=	10

## Hadronic Processes for kaon-

hElastic	Models:	elastic	Emin(GeV)=	0	Emax(GeV)=	100000
hInelastic	Models:	QGS	Emin(GeV)=	8	Emax(GeV)=	100000
		Bertini	Emin(GeV)=	0	Emax(GeV)=	10

## Hadronic Processes for lambda

hElastic	Models:	elastic	Emin(GeV)=	0	Emax(GeV)=	100000
hInelastic	Models:	FTF	Emin(GeV)=	8	Emax(GeV)=	100000
		Bertini	Emin(GeV)=	0	Emax(GeV)=	10

## Hadronic Processes for neutron

hElastic	Models:	elastic	Emin(GeV)=	0	Emax(GeV)=	100000
hInelastic	Models:	QGS	Emin(GeV)=	8	Emax(GeV)=	100000
		Binary	Emin(GeV)=	0	Emax(GeV)=	10
nCapture	Models:	LCapture	Emin(GeV)=	0	Emax(GeV)=	10
nFission	Models:	LFission	Emin(GeV)=	0	Emax(GeV)=	10

## Hadronic Processes for pi+

hElastic	Models:	elastic	Emin(GeV)=	0	Emax(GeV)=	100000
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# QBBC Options

- ▶ Several predefined configuration:
  - QBBC, QBEC, QBBC\_HP, QBEC\_HP, QGSP, QGSP\_BERT
- ▶ Any combination can be configured potentially

# Verbosity = 1 for QBBC



```
/testhadr/Physics      QBBC  
PhysicsList::AddPhysicsList: <QBBC>
```

```
Hadronic Processes for anti_neutron
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for anti_proton
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for kaon+
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for kaon-
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for lambda
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for neutron
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for pi+
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for pi-
```

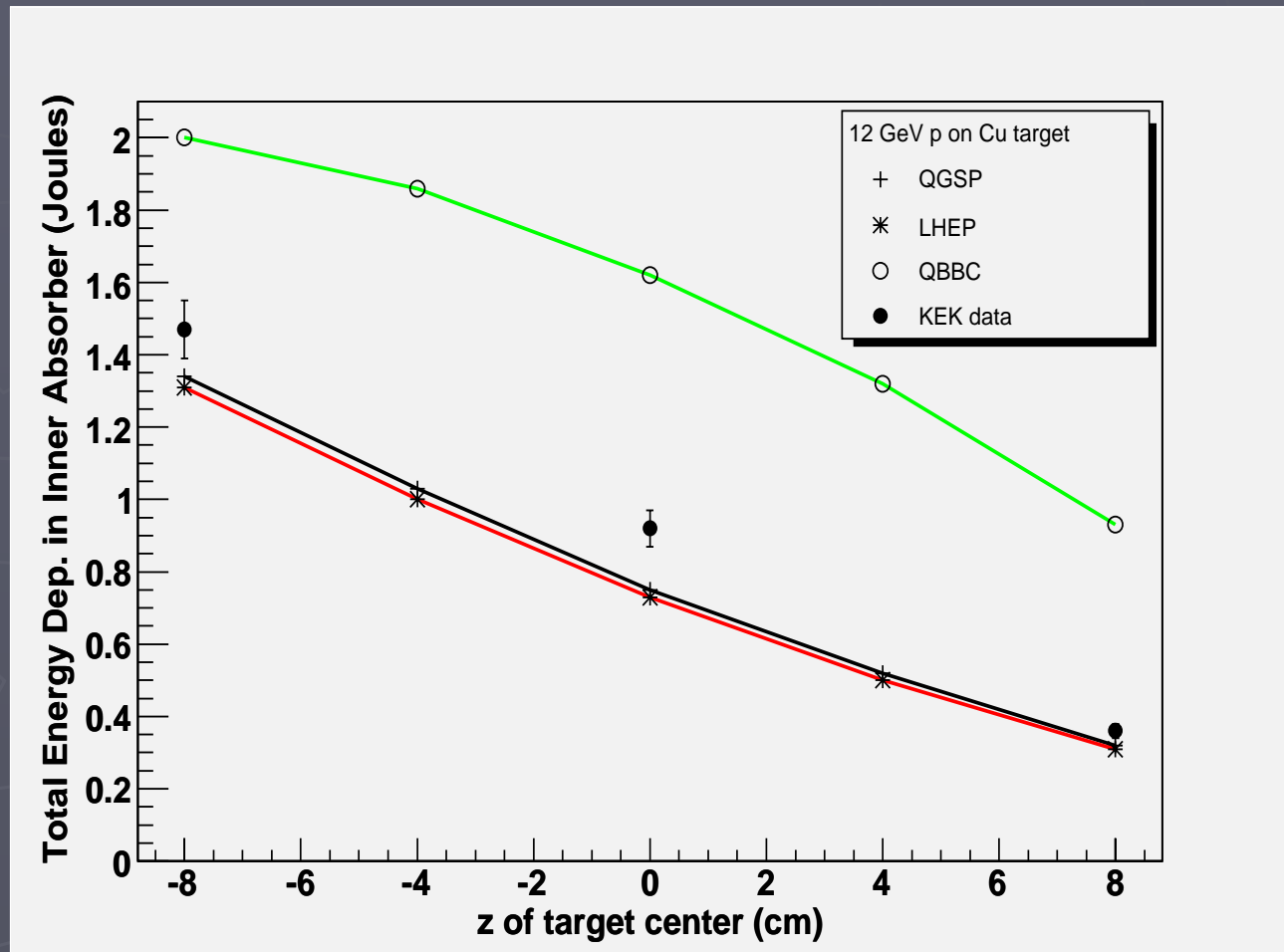
```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

```
Hadronic Processes for proton
```

```
  hElastic      Models:  elastic  Emin(GeV)=  0  Emax(GeV)= 100000
```

# Hadronic Benchmark #5 (D.Wright)

- ▶ LHEP is equal to QGSP
- ▶ QBBC is very off
- ▶ 1<sup>st</sup> interaction likely is very important
- ▶ QGS angular distribution is problematic
- ▶ HARP data!



# Personal Current Point of View

- ▶ Keep Physics Lists as it is for December
  - Only minor improvement: merge 20 zero size libraries into 1
- ▶ For next year plan inter-category project
  - Formulate and agree on requirements
  - Do design using Rose
  - Implementation only in second part of the next year not earlier