

LLH Scans in Energy

Kasper Pedersen, Msc. Student
IceCube, NBI

UNIVERSITY OF COPENHAGEN

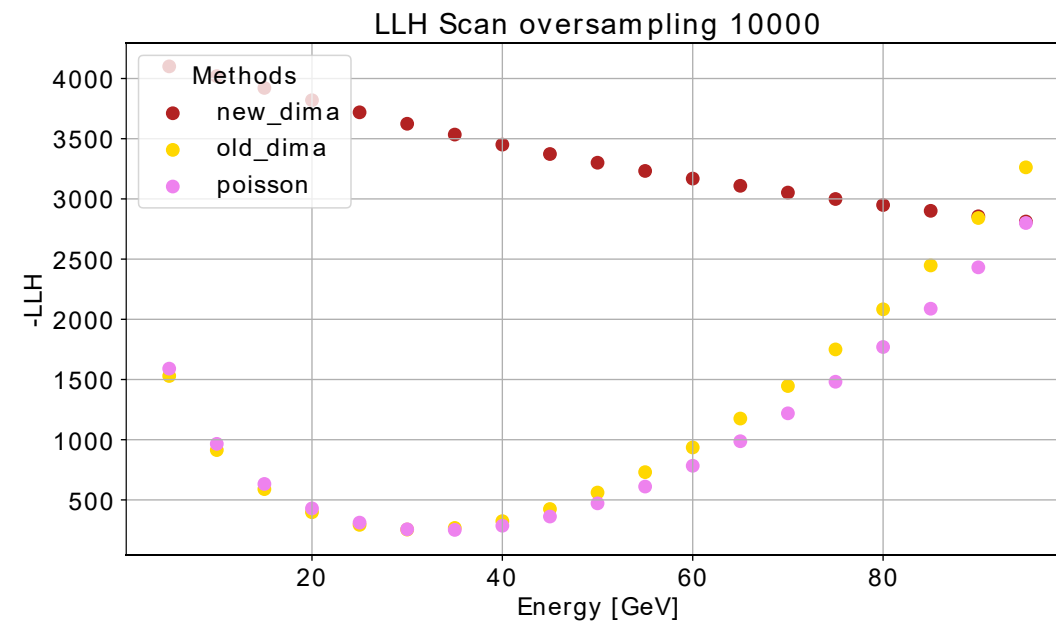
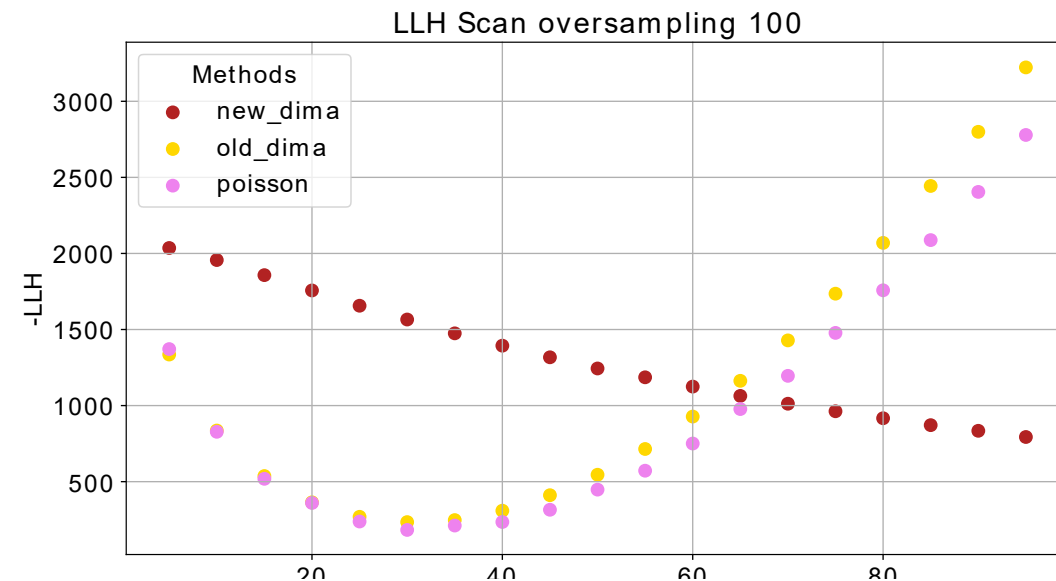
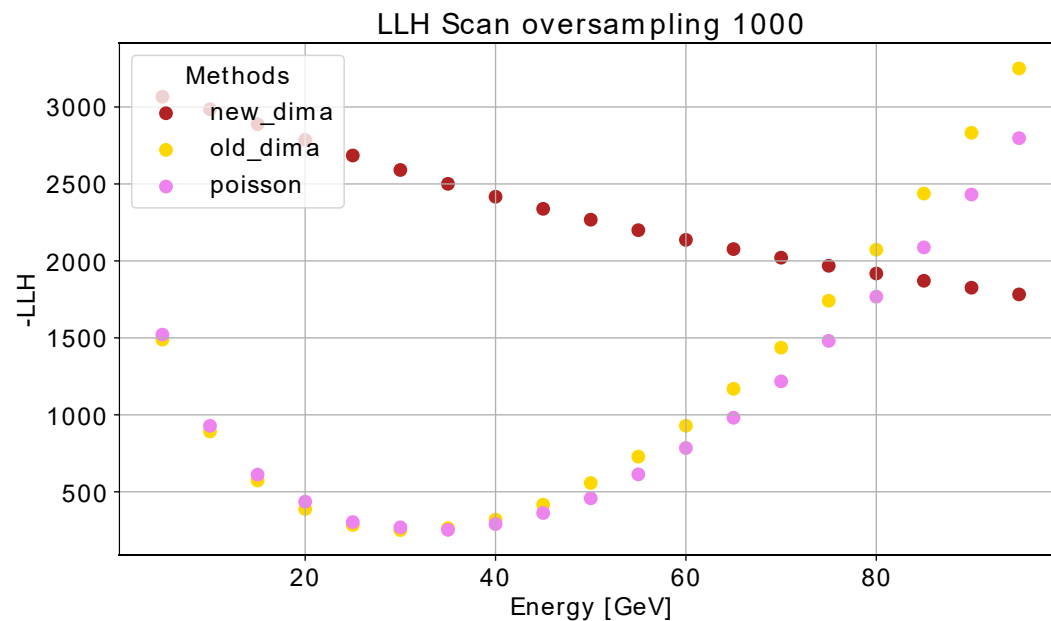


What

- Likelihood scans over energy range [5 , 95] GeV
 - True Energy is 50 GeV
- Compare new_dima, old_dima and poisson likelihood calculations at different oversampling
- Testing effect on LLH-scan of different monopod settings

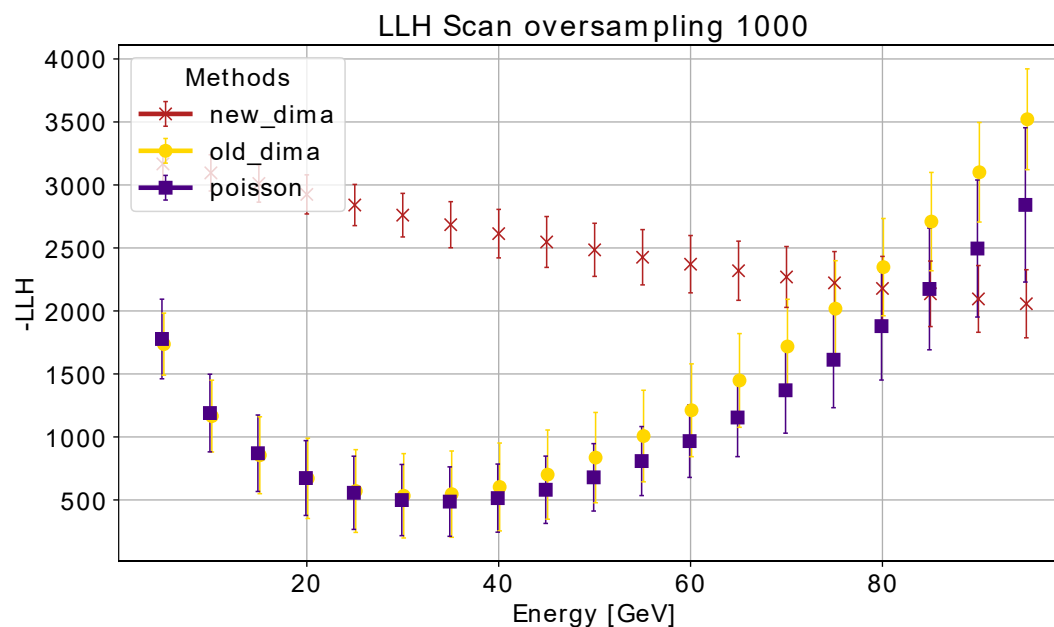
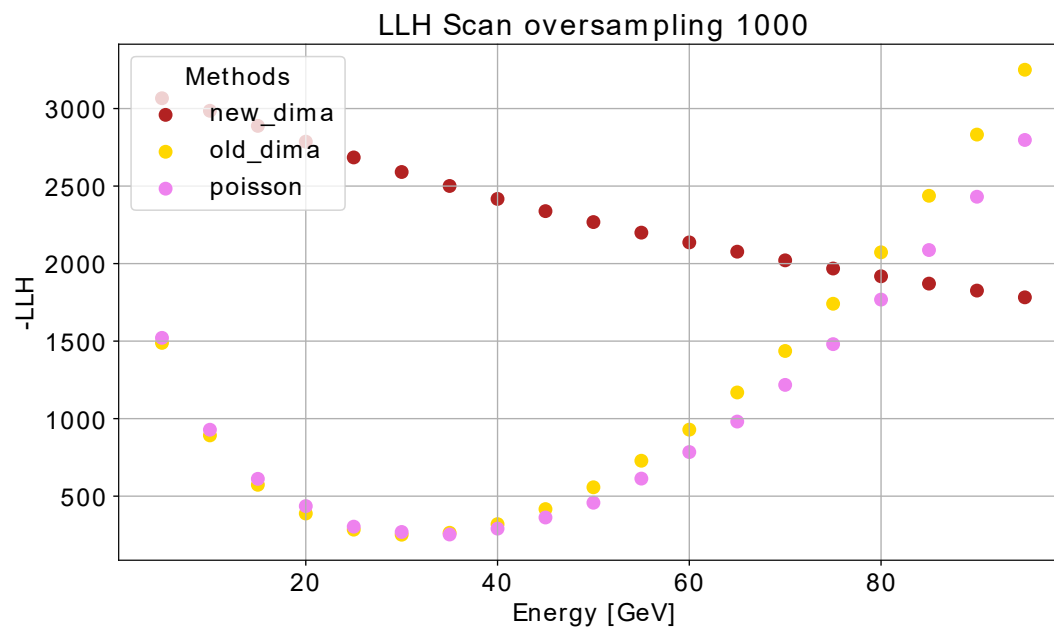
Single event

- New_dima is obviously not doing anything good
- Minimum is around 30-35 GeV
- Dima and Poisson agrees more around minimum as oversampling increases



Average 50 events

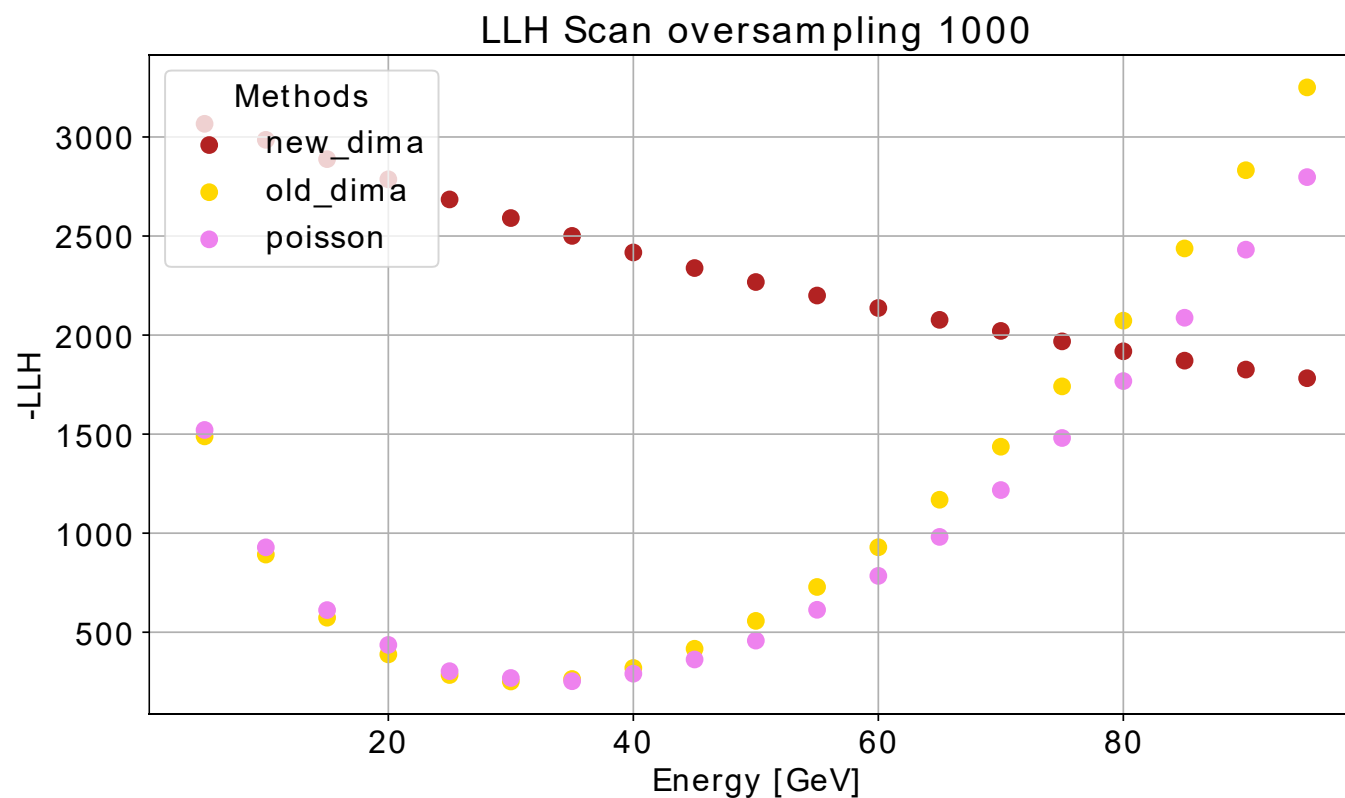
- Overall tendency is same when averaging over 50 events
- Points are mean of LLH
- Errorbars are the standard deviation
 - Seem to be minimal around true energy for Poisson



Changing settings in Monopod 1/6

- Table with default parameters

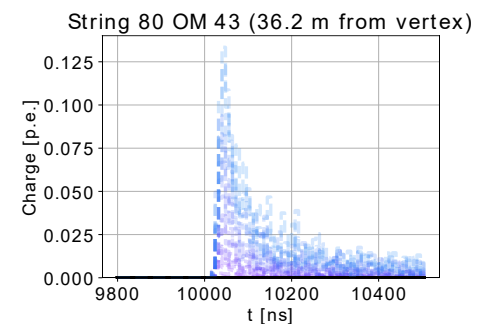
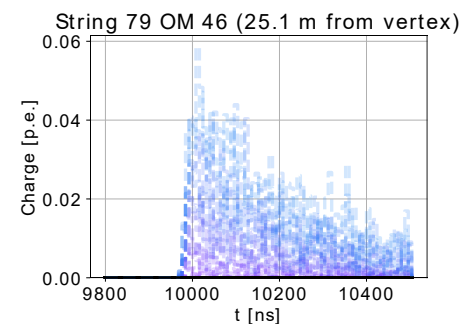
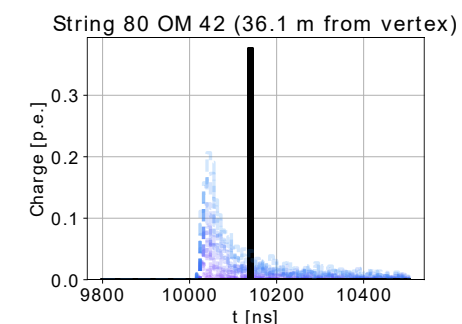
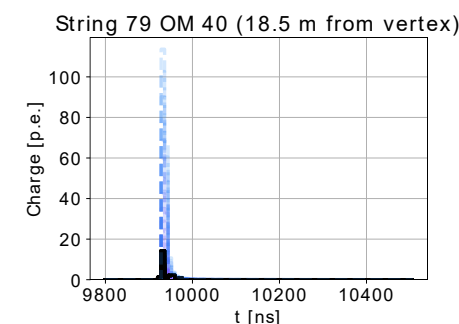
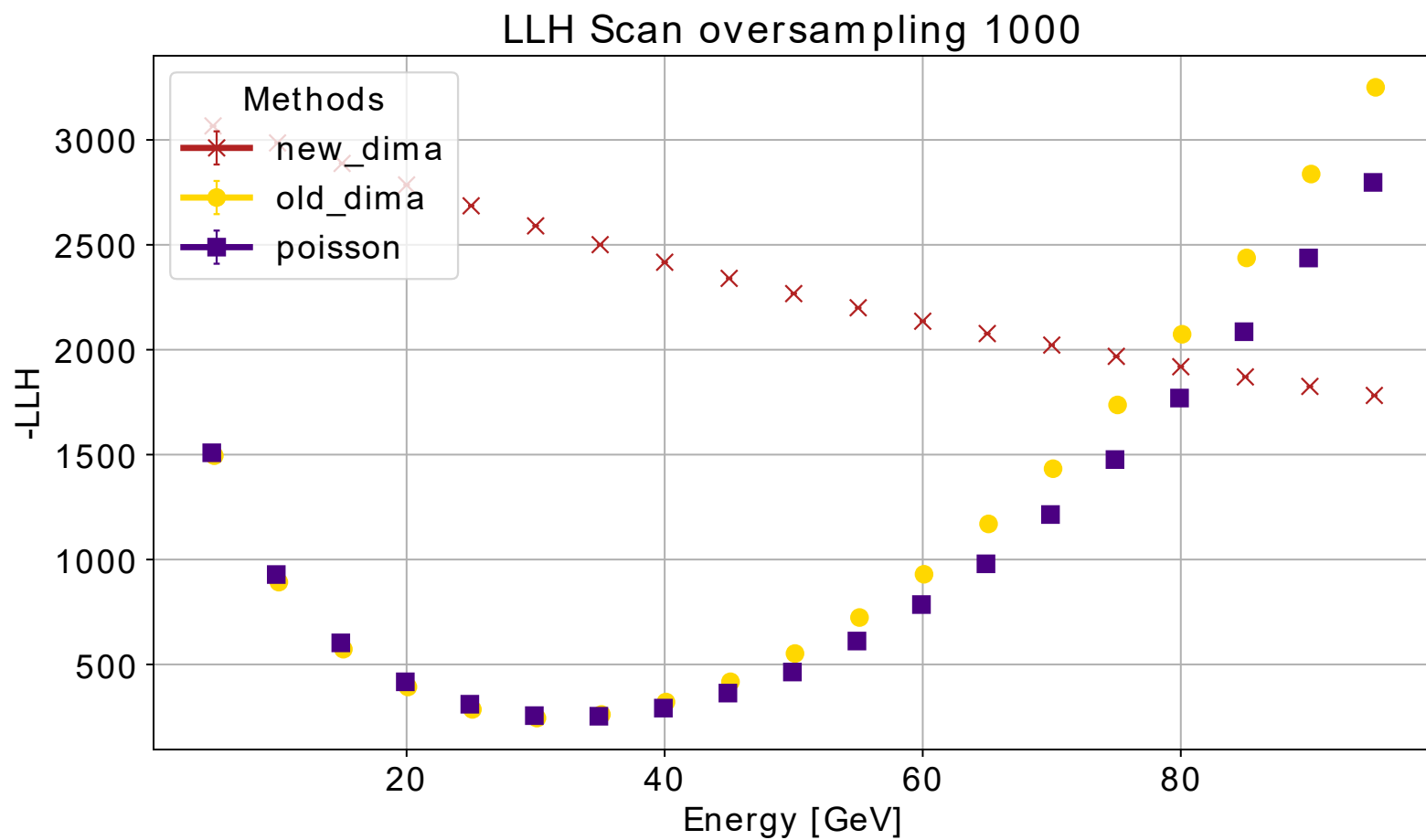
PhotonsPerBin	UniformTimeBins	MinTimeWidth	ReadoutWindow	UseUnhitDoms	EnergyScale
1	True	8 ns	9800-10500 ns	True	False



[Link to equivalent plot from Jonathan](#)

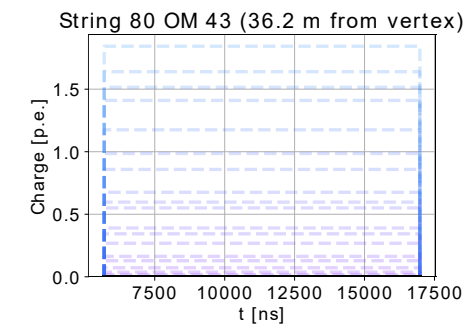
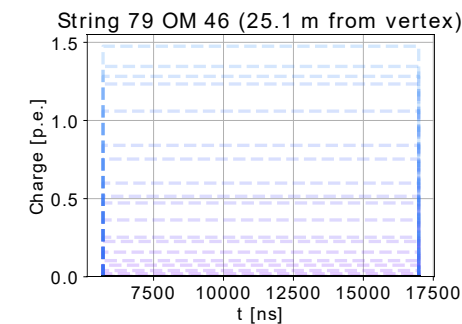
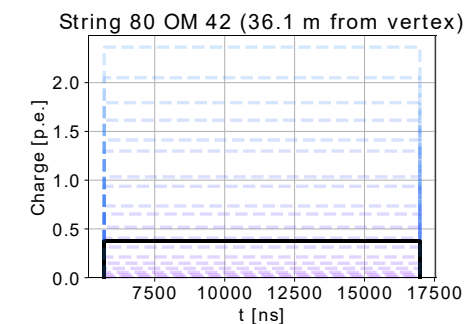
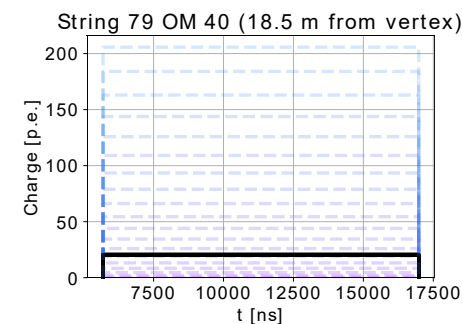
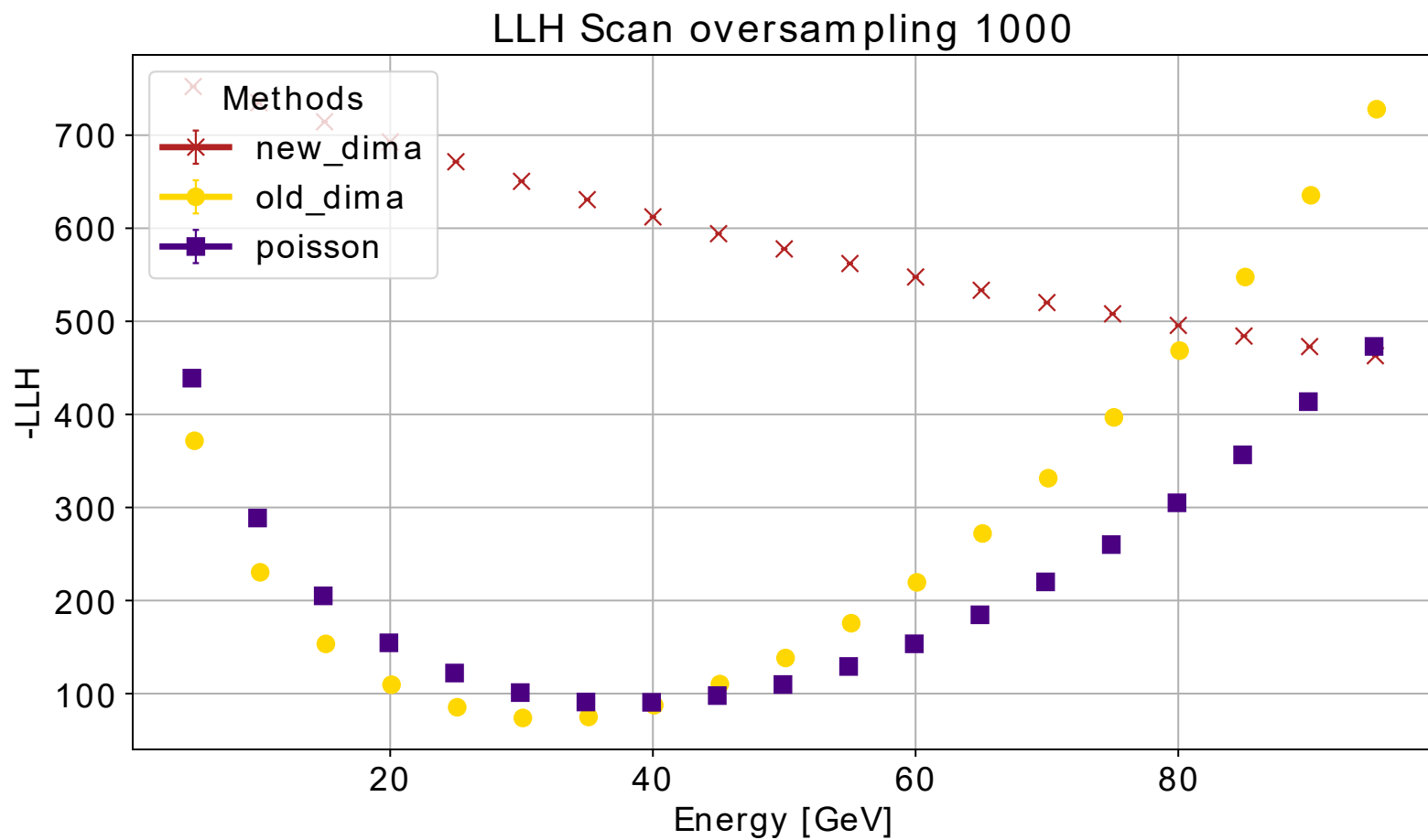
Changing settings in Monopod 2/6

PhotonsPerBin	UniformTimeBins	MinTimeWidth	ReadoutWindow	UseUnhitDoms	EnergyScale
-1	True	8 ns	9800-10500 ns	True	False



Changing settings in Monopod 3/6

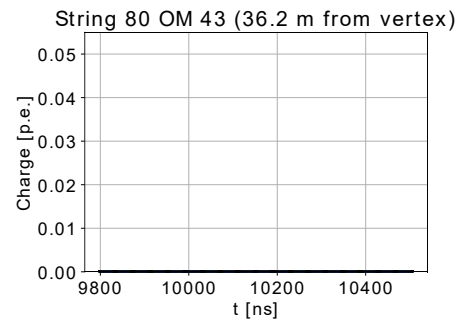
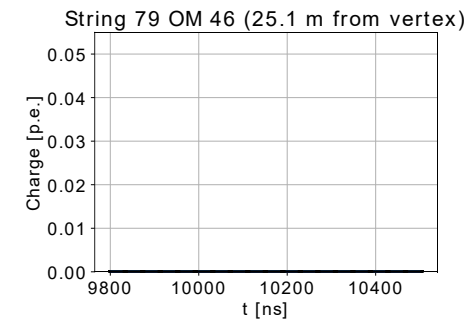
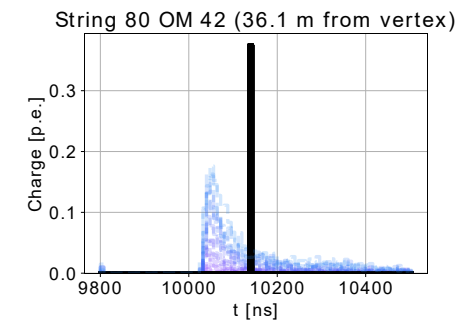
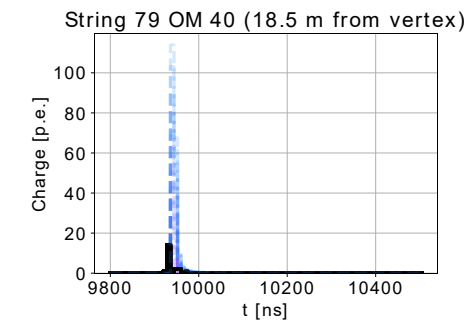
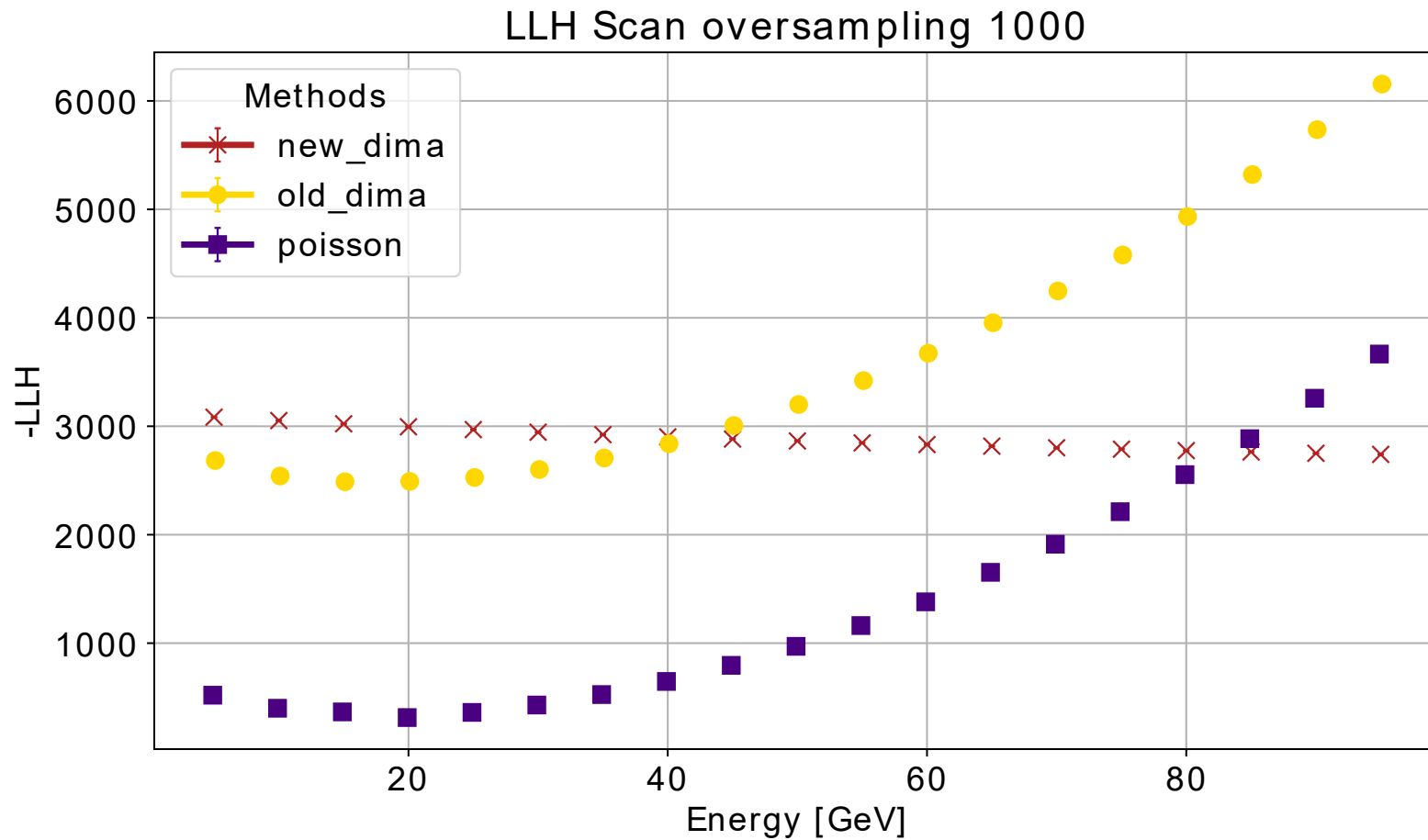
PhotonsPerBin	UniformTimeBins	MinTimeWidth	ReadoutWindow	UseUnhitDoms	EnergyScale
-1	False	8 ns	5693.02-16978.7 ns	True	False



[Link to equivalent plot from Jonathan](#)

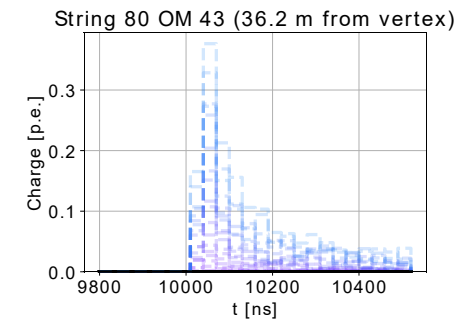
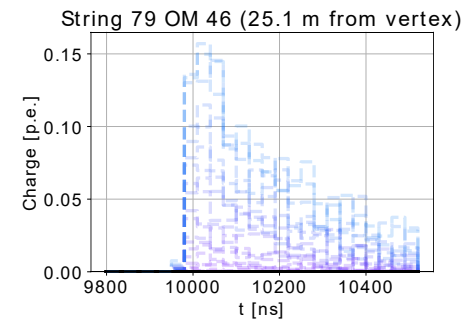
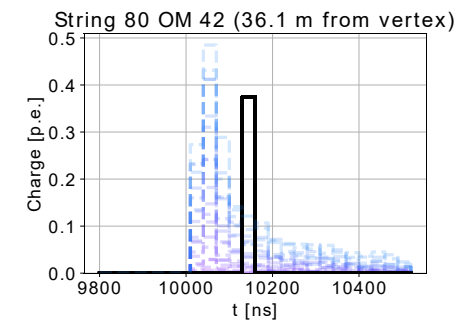
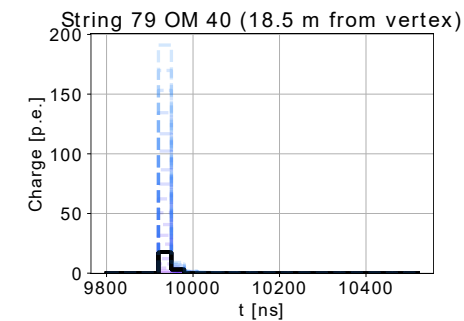
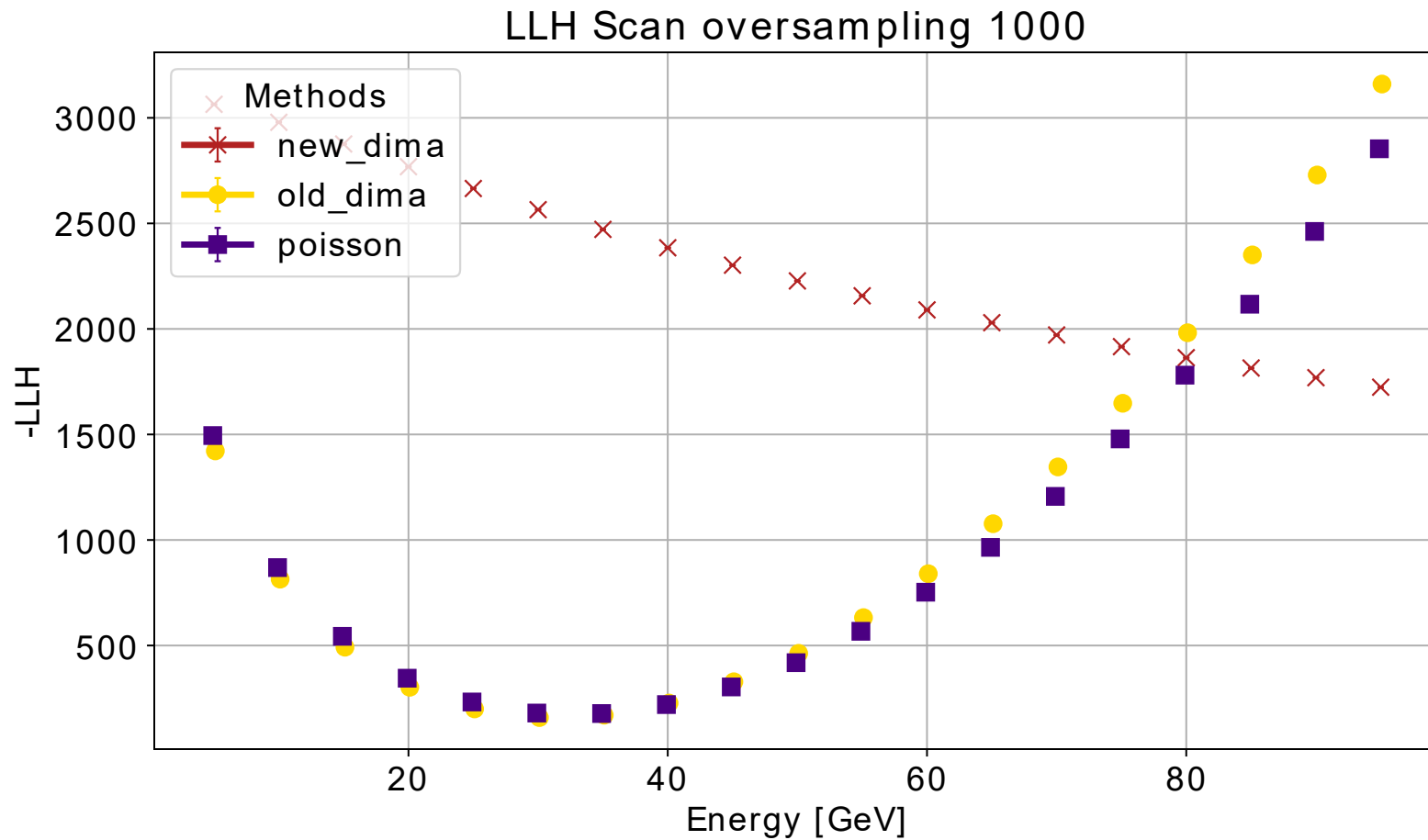
Changing settings in Monopod 4/6

PhotonsPerBin	UniformTimeBins	MinTimeWidth	ReadoutWindow	UseUnhitDoms	EnergyScale
1	True	8 ns	9800-10500 ns	False	False



Changing settings in Monopod 5/6

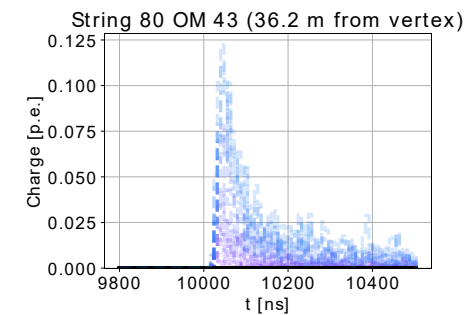
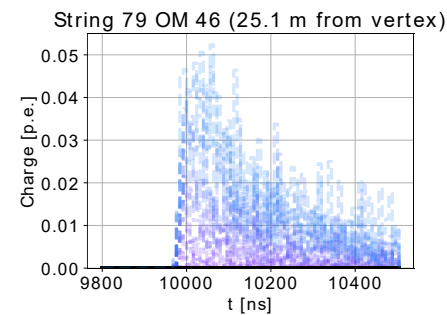
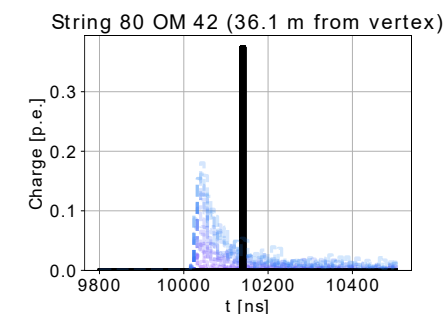
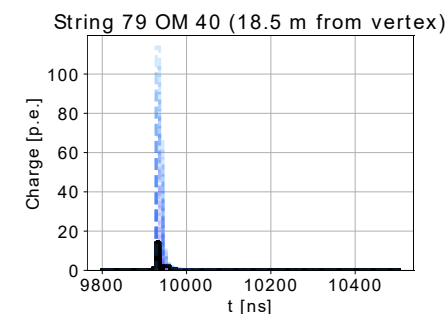
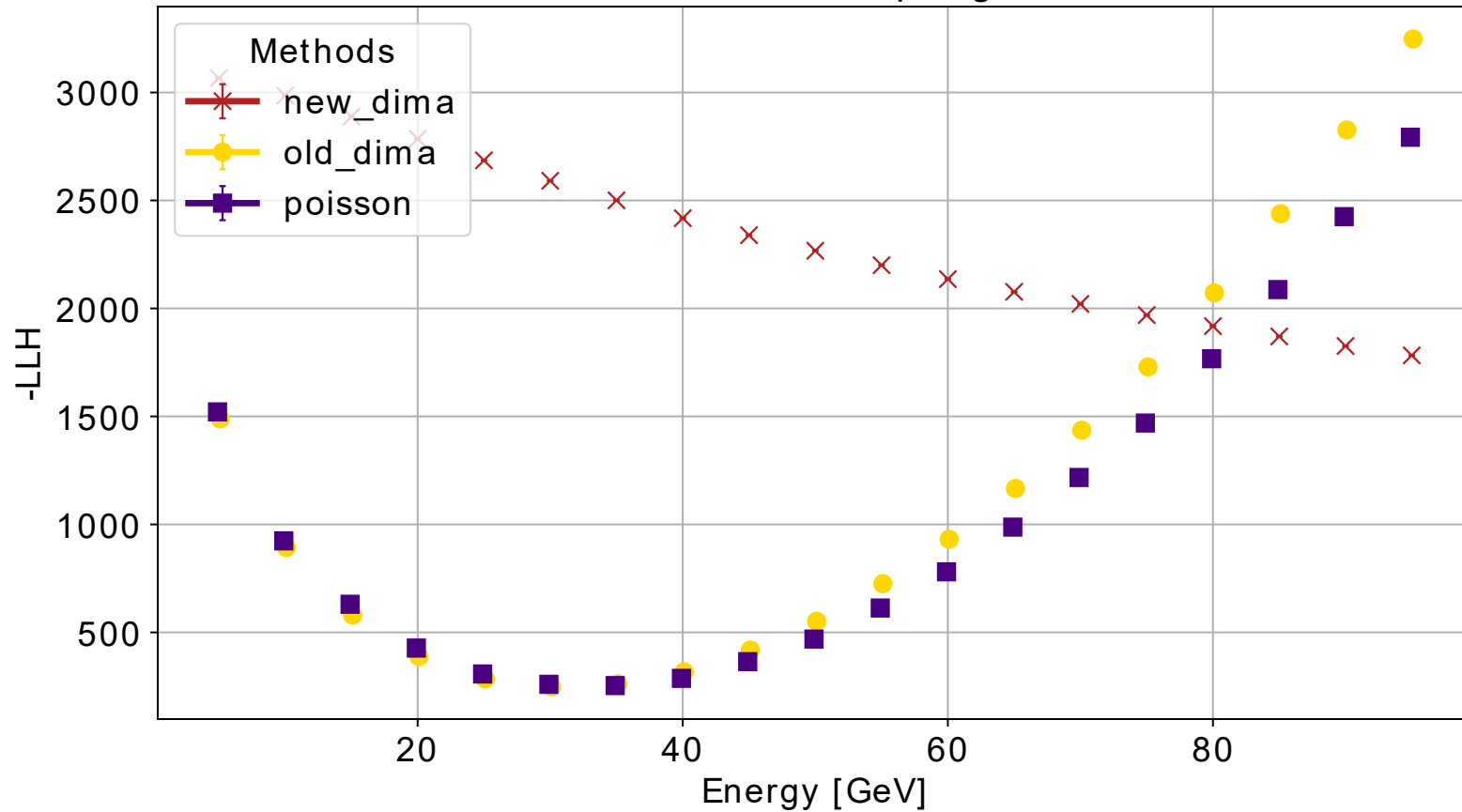
PhotonsPerBin	UniformTimeBins	MinTimeWidth	ReadoutWindow	UseUnhitDoms	EnergyScale
1	True	30 ns	9800-10500 ns	True	False



Changing settings in Monopod 6/6

PhotonsPerBin	UniformTimeBins	MinTimeWidth	ReadoutWindow	UseUnhitDoms	EnergyScale
1	True	8 ns	9800-10500 ns	True	True

LLH Scan oversampling 1000



Todo

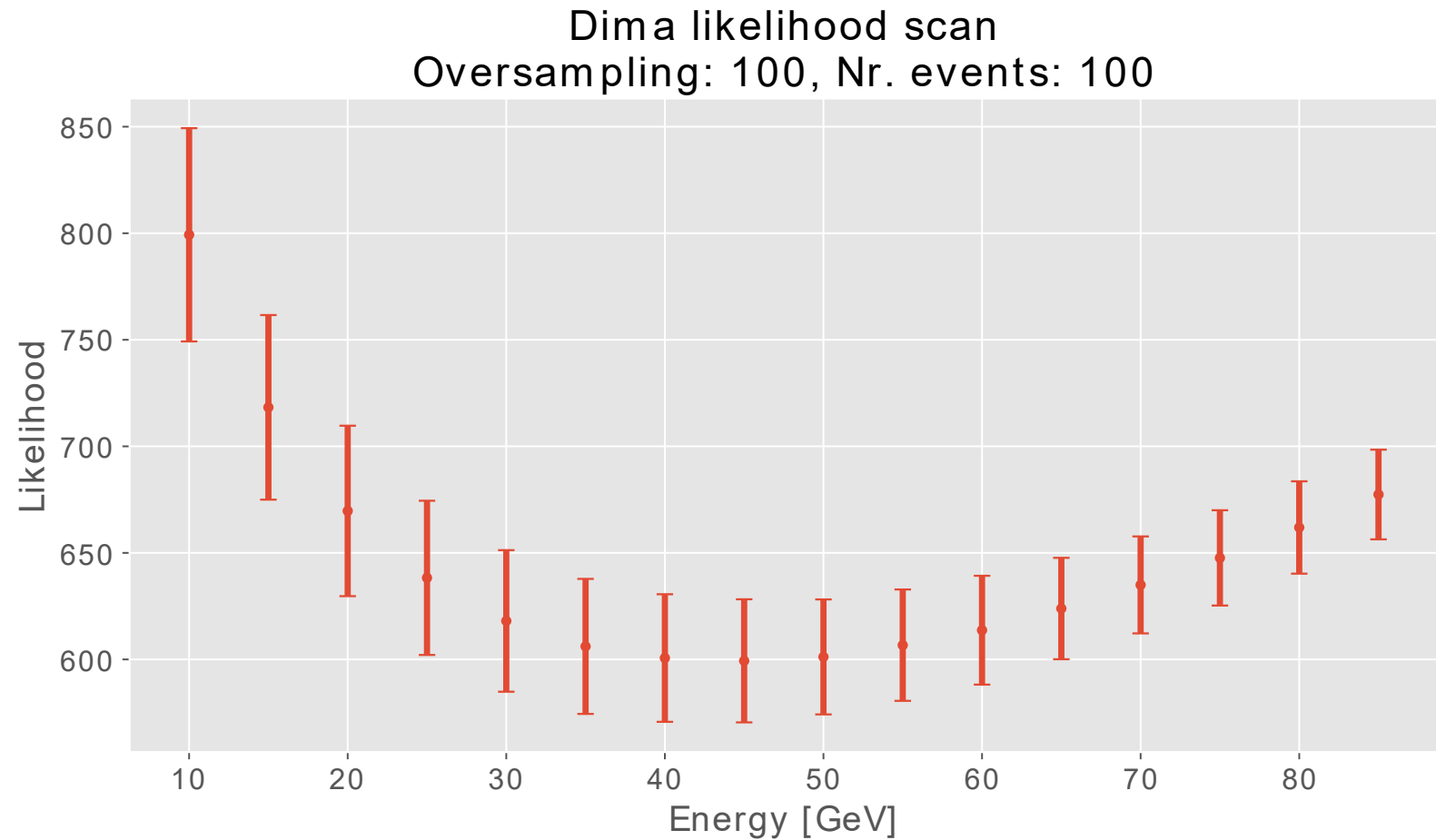
- Inputs are welcome
- 2D scan over energy and zenith



Bonus Slides

Plot from Jonathan

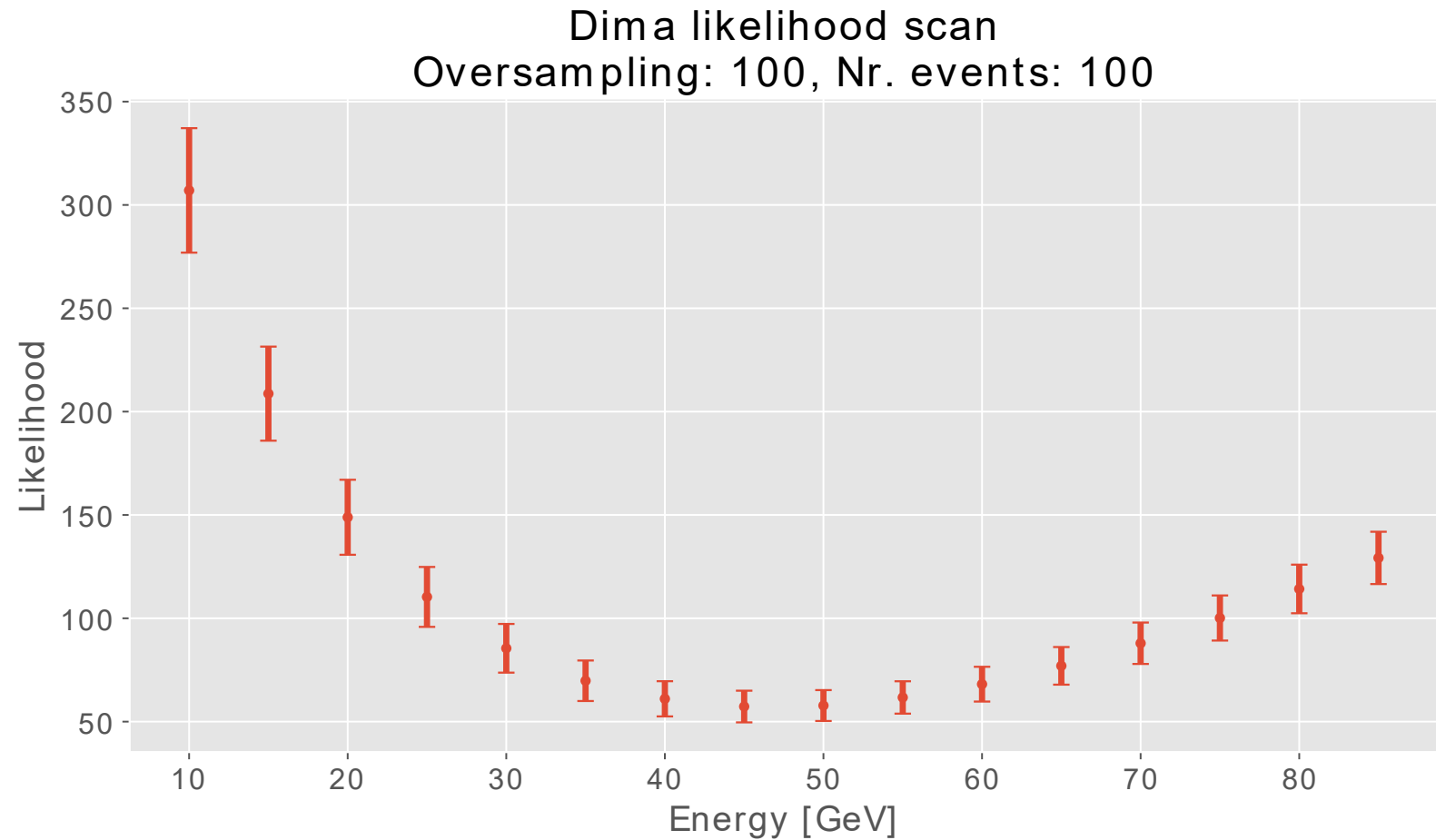
- Using UniformTimeBinning
- Minimum ~ 45 GeV
- Standard deviation goes down as Energy goes up



[Go Back](#)

Plot from Jonathan

- Using PhotonPerBin = -1
- Minimum ~45-50 GeV
- Standard deviation goes down around minimum



[Go Back](#)