

Auxiliary material for the paper
“First neutrino interaction candidates at the LHC”

FASER Collaboration

May 2021

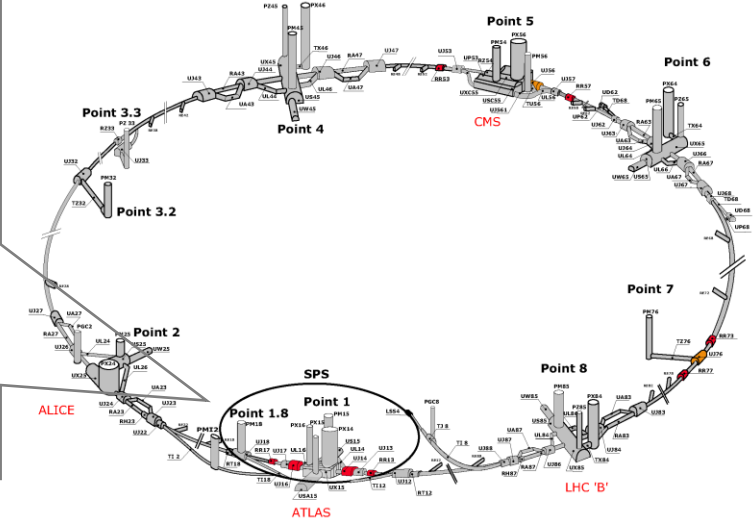
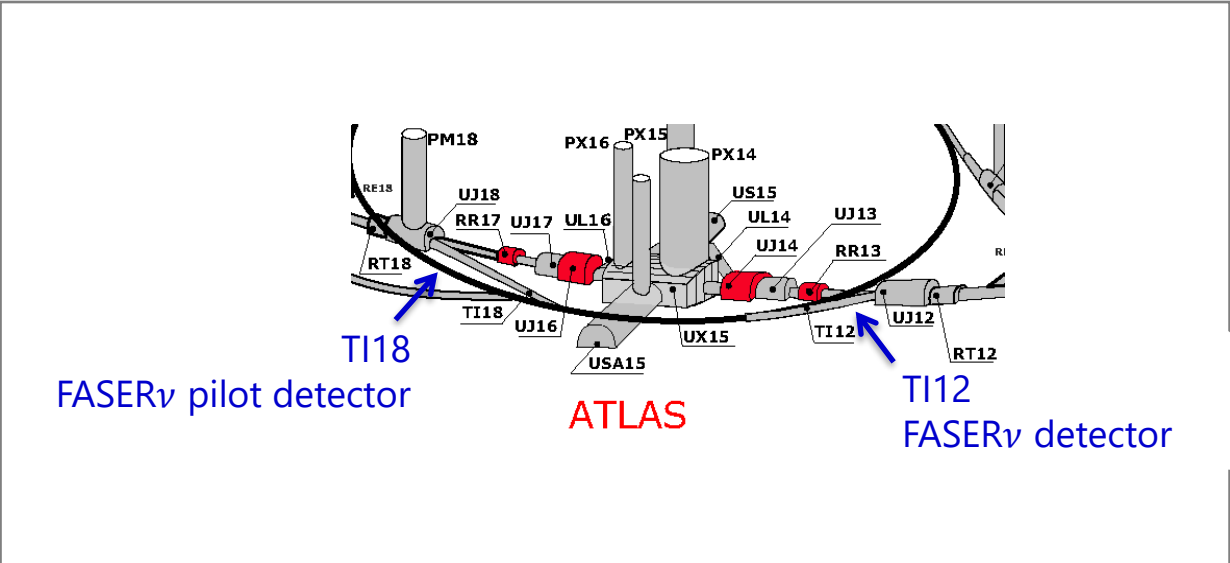


Fig. 1. Location of the T118 and T112 tunnels.

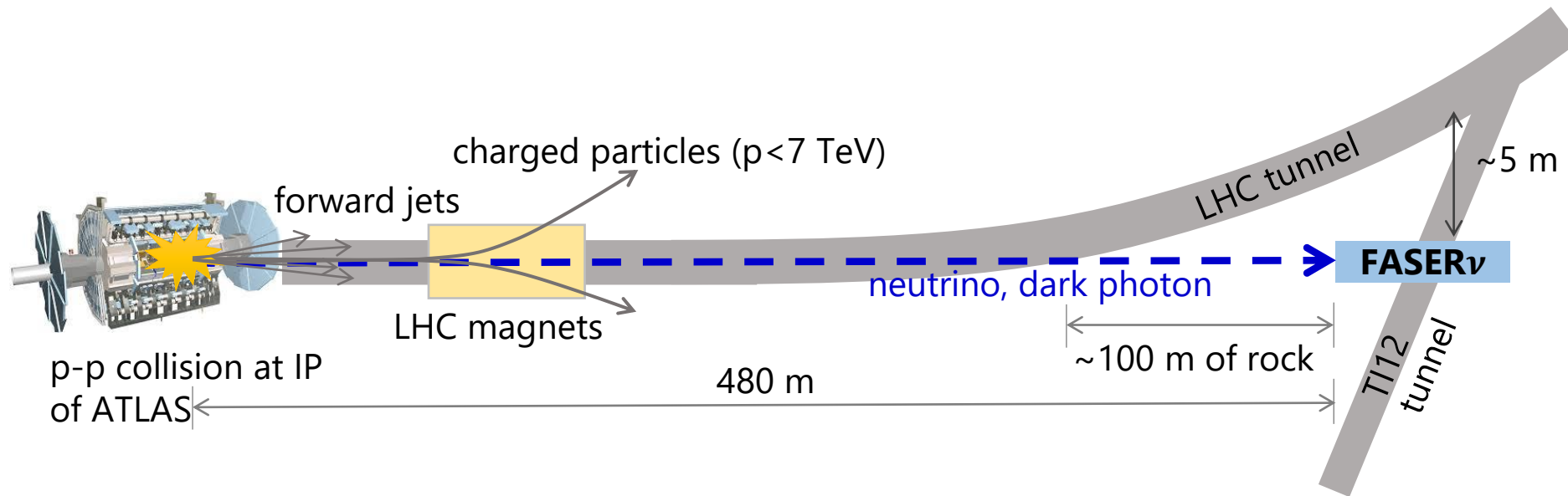


Fig. 2. Location of the FASER ν detector. Location of the pilot detector is symmetric to this detector with respect to the ATLAS interaction point.

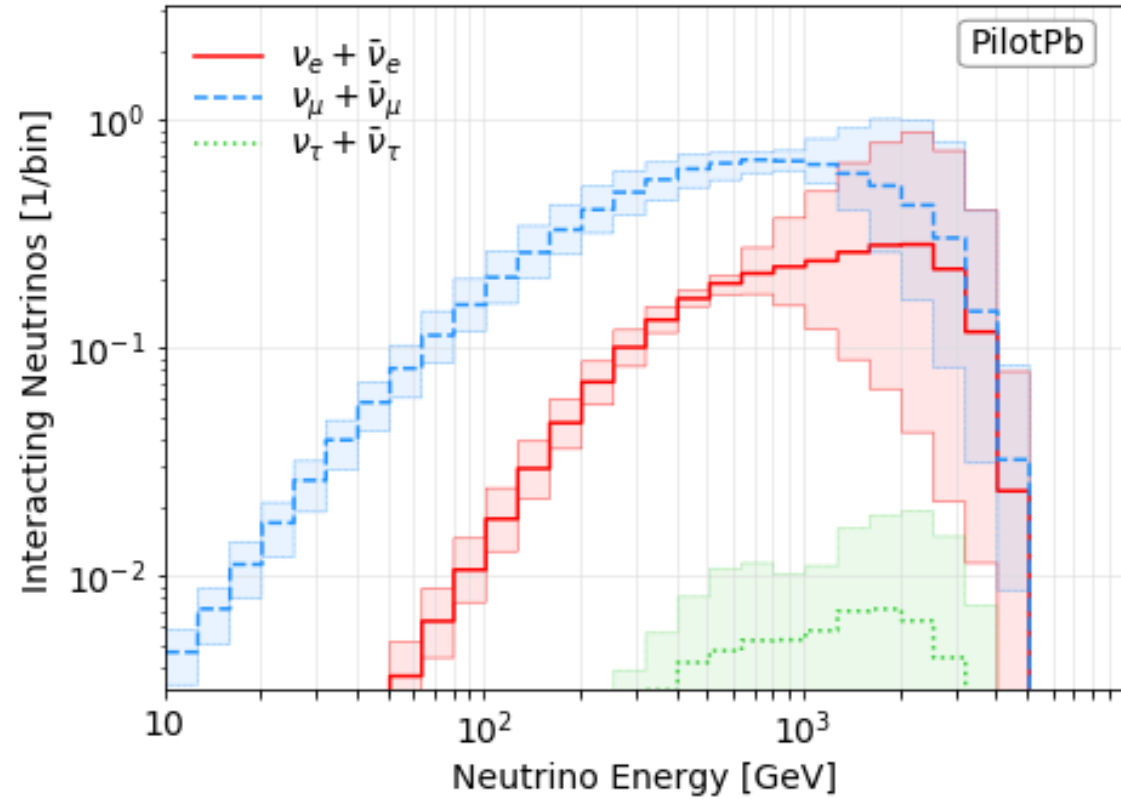


Fig. 3. Energy distributions of neutrinos interacting with the pilot detector for 12.2 fb⁻¹ of proton-proton collision data at a center-of-mass energy of 13 TeV. The thick lines show the average prediction of different generators, while the shaded band corresponds to the range of predictions obtained with the different generators.

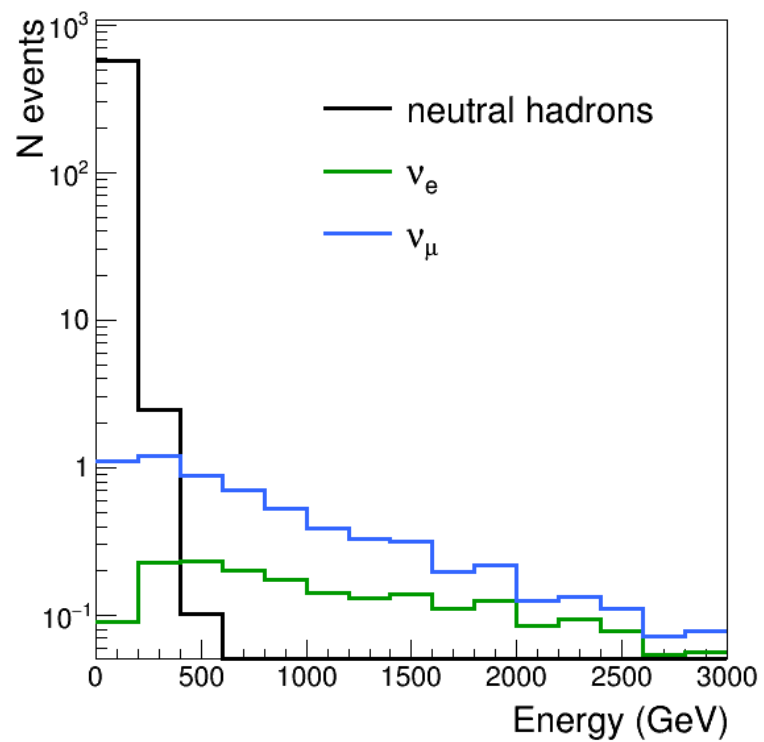
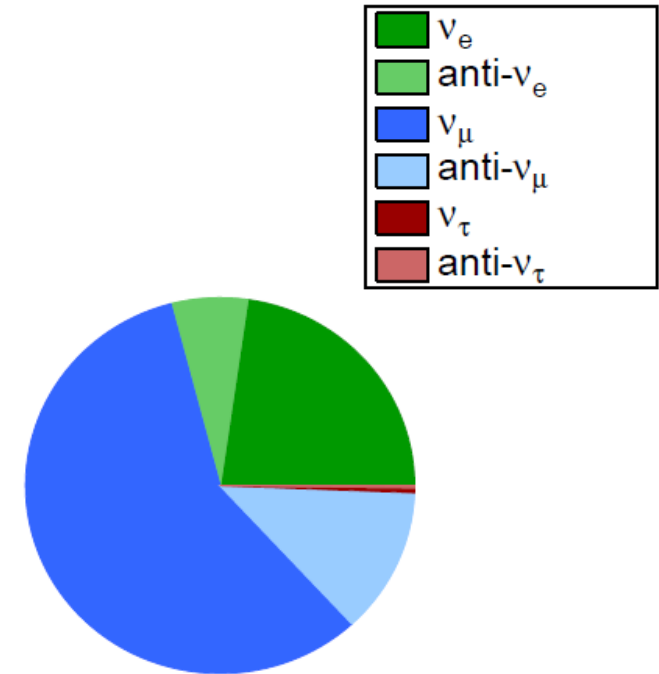


Fig. 4. Energy distributions of neutrinos and neutral hadrons interacting with the pilot detector. ν_τ is not shown since the expected number is only 0.05. The neutral hadron distribution is from the simulation described in the paper. The distributions are normalized to 12.2 fb^{-1} .

Table 1. Breakdown of the expected neutrino signal events

		N int in the effective volume	Vertex selection efficiency	After the efficiency applied
ν_e	CC	1.17	0.522	0.61
	NC	0.35	0.386	0.14
$\bar{\nu}_e$	CC	0.45	0.372	0.17
	NC	0.16	0.265	0.043
ν_μ	CC	3.88	0.404	1.57
	NC	1.15	0.288	0.33
$\bar{\nu}_\mu$	CC	1.13	0.290	0.33
	NC	0.42	0.202	0.085
ν_τ	CC	0.024	0.487	0.012
	NC	0.008	0.352	0.003
$\bar{\nu}_\tau$	CC	0.012	0.399	0.005
	NC	0.005	0.290	0.001



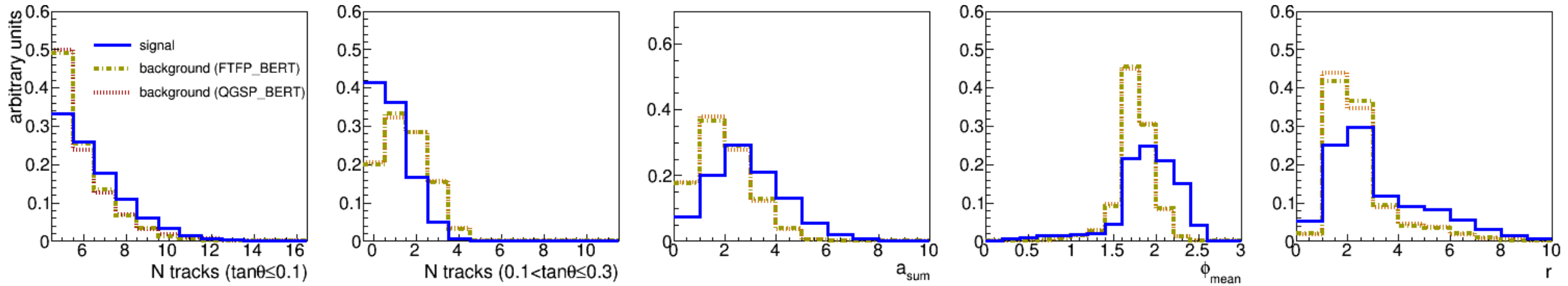


Fig. 5. Monte Carlo simulation distributions of the BDT input variables for the neutrino signal (blue) and neutral hadron background (shown separately for the two physics lists FTFP_BERT and QGSP_BERT). The distributions are normalized to the same number of events to compare the shapes.