Monte Carlo Simulated Samples

The table summarizes the simulated samples currently available.

ID	CoM Energy (TeV)	Process name	BIB	Events	Software	Generator (card)	Simulation	Reconstruction	Location	Authors	Date	Notes
001	1.5	Beam crossing	100%	1000	mars15 v02-05-MC/ v02-07-MC MuCollv1	detector-simulation/ utils/	001-Base	001-trimm	mars15/mumi-1e3x500-26m-lowth-excl_25ns_nEkin150MeV /mumi-1e3x500-26m-lowth-excl.txt mars15/mupl-1e3x500-26m-lowth-excl_25ns_nEkin150MeV /mupl-1e3x500-26m-lowth-excl.txt MuCollv1_25ns_nEkin150MeV_QGSPBERT	bartosik, gianelle	12/2020 06/2021 07/2022	#ID001
002	1.5	mumu2bdijet	100%	10k x 6	Pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets 005-Acts	pythia8/mumu2bdijet /bdijet_*_10kevt.stdhep mumu2dijetStudies/mumu2bdijet /CT & /ACTs	sestini, gianelle	03/2021 02/2022	#ID002 #ID005
003	1.5	mumu2cdijet	100%	10k x 6	Pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets 005-Acts	pythia8/mumu2cdijet /cdijet_*_10kevt.stdhep mumu2dijetStudies/mumu2cdijet /CT & /ACTs	sestini, gianelle	03/2021 02/2022	#ID002 #ID005
004	1.5	mumu2ldijet	100%	10k x 6	Pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets 005-Acts	pythia8/mumu2ldijet /ldijet_*_10kevt.stdhep mumu2dijetStudies/mumu2ldijet /CT & /ACTs	sestini, gianelle	03/2021 02/2022	#ID002 #ID005
005	1.5	mumu2H2bb	100%	10k	Pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets 005-Acts	pythia8/mumu2H2bb /mumu2H2bb1500_10k.stdhep mumu2H2bb /CT & /ACTs	sestini, gianelle	05/2021 12/2022	#ID005
006	3	mumu2HHnnuanu	0%	10k x 7	whizard v02-06-MC MuCollv1	001-whizard-mumu2HHnnuanu	002-HP_PhysicList	003-HiggsStudies	whizard/mumu2HHnnuanu /mumu2HH_bb_k*.hepmc ddsim/HiggsStudies/HP /mumu2HHnnuanu marlin/HiggsStudies/CT /mumu2HHnnuanu	lucchesi, buonincontri	04/2021	#ID003 Higgs studies
007	3	mumu24b_nuanu_G1	0%	10k	whizard v02-06-MC MuCollv1	TBC	002-HP_PhysicList	003-HiggsStudies	ddsim/HiggsStudies/HP /mumu24b_nuanu_G1 marlin/HiggsStudies/CT /mumu24b_nuanu_G1	buonincontri	04/2021	Higgs studies
008	3	mumu2bbH_nuanu	0%	10k	whizard v02-06-MC MuCollv1	TBC	002-HP_PhysicList	003-HiggsStudies	ddsim/HiggsStudies/HP /mumu2bbH_nuanu marlin/HiggsStudies/CT /mumu2bbH_nuanu	buonincontri	04/2021	Higgs studies
009	3	mumu2HHnunu_trilinear	0%	10k	whizard v02-06-MC MuCollv1	TBC	002-HP_PhysicList	003-HiggsStudies	ddsim/HiggsStudies/HP /mumu2HHnunu_trilinear marlin/HiggsStudies/CT /mumu2HHnunu_trilinear	buonincontri	04/2021	Higgs studies
010	3	mumu2mumu	0%	100k	v02-05-MC CLIC_o3_v14 .xml	TBC	001-Base	004-Luminosity	ddsim/LuminosityStudies /mumu2mumu marlin/LuminosityStudies/CT /mumu2mumu	buonincontri	11/2020	#ID004 Luminosity studies
011	3	mumu2mumu_bhabha	0%	100k	v02-05-MC CLIC_o3_v14 .xml	TBC	001-Base	004-Luminosity	ddsim/LuminosityStudies /mumu2mumu_bhabha marlin/LuminosityStudies/CT /mumu2mumu_bhabha	buonincontri	11/2020	Luminosity studies
012	1.5	mumu2Z2bb	100%	10k	pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets	pythia8/mumu2Z2bb /mumu2Z2bb_10kevt.stdhep mumu2Z2bb	sestini, gianelle	08/2021	
013	-	electrongun_pt1-1500GeV_theta10-170	0%	100k	v02-05-MC MuCollv1	001-electrongun	013-electrongun	013-electrongun	electrongun	casarsa	10/2021	
014	1.5	mumu2H2cc	100%	10k	pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets	pythia8/mumu2H2cc /mumu2H2cc1500_10k.stdhep mumu2H2cc	sestini, gianelle	10/2021	

015	1.5	mumu2H2ccX	100%	10k	pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets	pythia8/mumu2H2ccX /mumu2H2ccX1500_10k.stdhep mumu2H2ccX	sestini, gianelle	10/2021	
016	1.5	mumu2H2WW	100%	10k	whizard /pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets	whizard/mumu2H2WW /HH_WW_events_cuts_2.hepmc pythia8/mumu2H2WW /mumu2H2WW_muPt10_10kevt. stdhep mumu2H2WW mumu2H2WW_muPt10	sestini, gianelle	10/2021	
017	1.5	mumu2Z2cc	100%	10k	pythia8 v02-06-MC MuCollv1	TBC	001-Base	002-djets	pythia8/mumu2Z2cc /mumu2Z2cc1500_10k.stdhep mumu2Z2cc	sestini, gianelle	09/2021	
018	1.5	qqlnuInt	100%	10k	whizard v02-06-MC MuCollv1	TBC	001-Base	002-djets	whizard/qqlnuInt /qqlnu_events_cuts.hepmc qqlnuInt	lucchesi, gianelle	11/2021	
019	1.5	qqlnuInt_mucuts	100%	10k	whizard v02-06-MC MuCollv1	TBC	001-Base	002-djets	whizard/qqlnuInt_mucuts /qqlnu_events_mucuts.hepmc qqlnuInt_mucuts	lucchesi, gianelle	11/2021	
020	1.5	qqnunu	100%	10k	whizard v02-06-MC MuCollv1	TBC	001-Base	002-djets	whizard/qqnunu /qqnunu_events_cuts.hepmc qqnunu	lucchesi, gianelle	11/2021	
021	1.5	qqnunu_heavy	100%	10k	whizard v02-06-MC MuCollv1	TBC	001-Base	002-djets 005-Acts	whizard/qqnunu_heavy /qqnunu_events_heavy.hepmc qqnunu_heavy(/ACTs)	lucchesi, gianelle	11/2021 02/2022	#ID005
022	3	mumu2HH_bb	100%	10k x 7	whizard v02-07-MC MuCollv1	001-whizard-mumu2HHnnuanu	001-Base	005-Acts	whizard/mumu2HHnnuanu /mumu2HH_bb_k*.hepmc HiggsStudies/mumu2HH_bb /mumu2HH_bb_k* mumu2HH_bb_k1/4ML_training	lucchesi, gianelle	06/2022 04/2023	#ID003 Higgs studies
023	3	mumu24b_nuanu_G1	100%	10k	whizard v02-07-MC MuCollv1	TBC	001-Base	005-Acts	whizard/HH_bkg/bbbb_G1_3tev. hepmc HiggsStudies/bkg/bbbb_G1 HiggsStudies/bbbb_G1 HiggsStudies/bbbb_G1 /4ML_training	/lucchesi gianelle	06/2022 04/2023	Higgs studies
024	3	mumu2bbH_nuanu	100%	10k	whizard v02-07-MC MuCollv1	TBC	001-Base	005-Acts	whizard/HH_bkg/bbH_3tev. hepmc HiggsStudies/bkg/bbH HiggsStudies/bbH	lucchesi, gianelle	07/2022	Higgs studies
025	3	HH_bb_trilinearonly	100%	10k	whizard v02-07-MC MuCollv1	TBC	001-Base	005-Acts	whizard/mumu2HHnnuanu /HH_bb_trilinearonly.hepmc HiggsStudies/mumu2HH_bb /HH_bb_trilinearonly HH_bb_trilinearonly /4ML_training	lucchesi, gianelle	07/2022 04/2023	Higgs studies
026	1.5	w2jmu_hoffshell_had	100%	5k	pythia8 v02-07-MC MuCollv1	TBC	001-Base	005-Acts	pythia8/gammah /mc_w2jmu_hoffshell_had. hepmc gammah/w2jmu_hoffshell_had	giambastiani, gianelle	05/2022	gammah studies
027	1.5	w2jmu_honshell_had	100%	10k	pythia8 v02-07-MC MuCollv1	TBC	001-Base	005-Acts	pythia8/gammah /mc_w2jmu_honshell_had. hepmc gammah/w2jmu_honshell_had	giambastiani, gianelle	05/2022	gammah studies
028	1.5	w2jmu_bkg_had	100%	20k	pythia8 v02-07-MC MuCollv1	TBC	001-Base	005-Acts	pythia8/gammah /mc_w2jmu_bkg_had.hepmc gammah/w2jmu_bkg_had	giambastiani, gianelle	05/2022	gammah studies

029	1.5	z2jmu_hoffshell_had	100%	4k	pythia8 v02-07-MC MuCollv1	TBC	001-Base	005-Acts	pythia8/gammah /mc_z2jmu_hoffshell_had.hepmc Signal/marlin/gammah /z2jmu_hoffshell_had gammah/z2jmu_hoffshell_had	giambastiani, gianelle	05/2022	gammah studies
030	1.5	z2jmu_honshell_had	100%	4k	pythia8 v02-07-MC MuCollv1	TBC	001-Base	005-Acts	pythia8/gammah/" mc_z2jmu_honshell_had.hepmc Signal/marlin/gammah /z2jmu_honshell_had gammah/z2jmu_honshell_had	giambastiani, gianelle	05/2022	gammah studies
031	1.5	z2jmu_bkg_had	100%	10k	pythia8 v02-07-MC MuCollv1	TBC	001-Base	005-Acts	pythia8/gammah /mc_z2jmu_bkg_had*.hepmc gammah/z2jmu_bkg_had	giambastiani, gianelle	05/2022	gammah studies
032	1.5	mumu2WW_muPt10	0%	10k	pythia8 v02-06-MC MuCollv1	TBC	001-Base		pythia8/mumu2WW /mumu2WW_muPt10_10kevt.stdhep mumu2WW_muPt10	sestini, gianelle	09/2021	only signal simulation
033	1.5	z2jmu	100%	680k	v02-06-MC MuCollv1	TBC	001-Base	005-Acts	@CERN: /eos/experiment /muoncollider/gammah (different coupling: k08, k09, k098, k10, k102, k11, k12, k20)	giambastiani, gianelle	12/2022	gammah studies
034	1.5	wzf3mu	100%		v02-06-MC MuCollv1	TBC	001-Base	005-Acts	mcprod-hZ_wzf_3mu	giambastiani, Pagan Griso	04/2023	gammah studies

- `Id`: represents an unique number associated to the sample;
- `CoM Energy (TeV)` centre of mass energy of the hard-scattering process;
- `Process name` is a short description of the physics process (e.g. HH_bbbb, ...);
- `BIB` specifies if beam-induced background is fully included (`1`), partially included (e.g. `0.1` for 10% of expected BIB rate), or not included `0`; if a different configuration (e.g. CoM energy) is used for BIB and hard-scattering, please specify it in the `Notes` column.
- `Events` number of events generated;
- `Software` is the list of the software/detector versions, as tagged in the repository and described in the software releases; if a custom version is used, please add "_custom" to the starting software version, add in the `Notes` what is special and add a link to the relevant code commit, if possible;
- `Generator (card)` is a short name of the folder in the repository containing the configuration for the generator/process used (the link should preferably be to a specific commit/version of the card);
- `Simulation` is a short name of the folder in the repository containing the simulation settings and a link to it (the link should preferably be to a specific commit/version of the card);
- `Reconstruction` is a short name of the folder in the repository containing the reconstruction settings and a link to it (the link should preferably be to a specific commit/version of the card);
- Location: list of the directories on the SE (*srm://storm-fe-archive.cr.cnaf.infn.it:8444/muoncoll/)* where data have stored (the path follows the convention: <S in GeV>/<Signal or BIB or Mixed>/<Generator Process>/<Dataset name>)
- Authors: one or more authors/responsible of the samples
- Date: month/year of sample's production
- `Notes` contains any special remark that is deemed useful to know.

TBC: to be complete

TBT: to be transfer

Data has stored on the SE **srm://storm-fe-archive.cr.cnaf.infn.it:8444/muoncoll** using the path:

srm://storm-fe-archive.cr.cnaf.infn.it:8444/muoncoll/<S in GeV>/<Signal or BIB or SigBkg>/<Generator Process>/<Dataset name>

Notes

ID001

- For the generation see *readme_MARS15_1500GeV.txt*
- ¯ and + are simulated in separated files
- trimmed (¯ + +) versions with trkHits and allHits are produced
- seeds are created with 25ns as maximum time of accepted particles and 0.15GeV as the minimum energy of accepted neutrons

ID002

- 6 pt ranges: [0:40] ; [40:80] ; [80:120] ; [120:160] ; [160:200] ; [200:INF]
- simulation outputs have been split in files of about 6Gbs

- About 1500 events per type have been reconstructed

ID003

- 7 levels of couplings: 0.4, 0.6, 0.8, 1, 1.2, 1.4, 1.6
- Jet analysis has been performed

ID004

- Added also a file with 10k events with eta 2.7

ID005

- Reconstructed also some events with ACTs tracking system (v02-07-MC)

MARS15 beam-induced background samples

- 125 GeV: readme_MARS15_125GeV.txt
- 1.5 TeV: readme_MARS15_1500GeV.txt