Polarisation study
LO & NLO updates

5th meeting, 19.06.2024

Giovanni Pelliccioli (MAX-PLANCK-INSTITUT FÜR PHYSIK)

COMETA

LO (tree level): integrated

code	OS approx.	full	unpol.	LL	LT	TL	TT
MoCaNLO	DPA	11.336(1)	11.242(1)	0.6574(1)	1.3332(2)	1.3370(2)	7.7874(8)
STRIPPER	DPA	11.3357(4)	11.2451(2)	0.6560(0)	1.3326(0)	1.3365(0)	7.7925(1)
MulBos	DPA	—	11.2393(3)	0.6572(0)	1.3329(1)	1.3366(1)	7.7846(2)
BBMC	DPA	11.3372(4)	11.2424(3)	0.6574(0)	1.3333(1)	1.3372(1)	7.7872(2)
Sherpa	NWA	11.363(6)	11.513(4)	0.6767(4)	1.3538(6)	1.3734(6)	7.952(3)
MadGraph	NWA	10.62(4)	10.52(4)	0.604(2)	1.237(5)	1.228(4)	7.38(3)
PowHeg-Box	DPA	11.335(1)	11.245(1)	0.6575(1)	1.3333(1)	1.3374(1)	7.7885(8)

➔ Sherpa NWA better agreement now, ~2.5% higher than DPA calc's
➔ MadGraph issue still pending (updates?)
➔ DPA results agree by less than 3 STDs, PowHeg included

LO (tree level), differential, LL
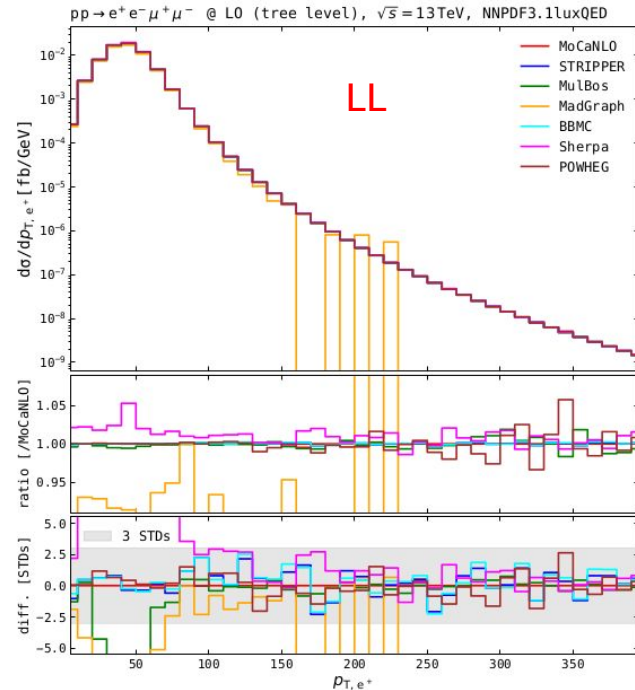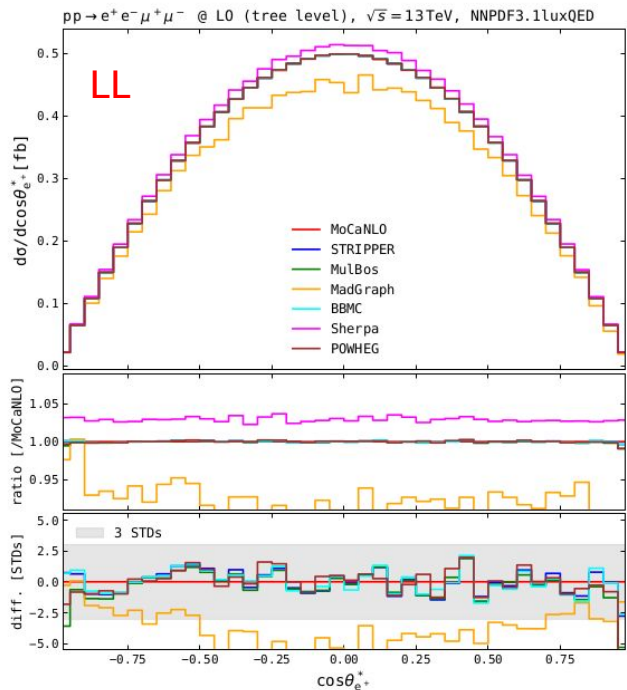
➔ asymmetry in STRIPPER fixed
➔ shift in SHERPA (+2.5%) and MG5 (-8%)

➔ discrep. at low pT between NWA & DPA calc's
➔ effect also in MulBos

NLO EW

| code	OS approx.	full	unpol.	LL	LT	TL	TT
MoCaNLO	DPA	10.080(2)	10.0213(8)	0.59068(9)	1.1994(1)	1.20293(9)	6.9129(3)
MulBos	DPA	–	10.0203(3)	0.59058(2)	1.19926(4)	1.20294(4)	6.9121(3)
BBMC	DPA	10.082(2)	10.0203(4)	0.59057(4)	1.19949(6)	1.20308(9)	6.9125(3)

➔ All DPA fiducial integrated results agree by less than 3 STDs at NLO EW
➔ some deviations differentially between MulBos and MoCaNLO/BBMC: to understand

Fig.'s: LL
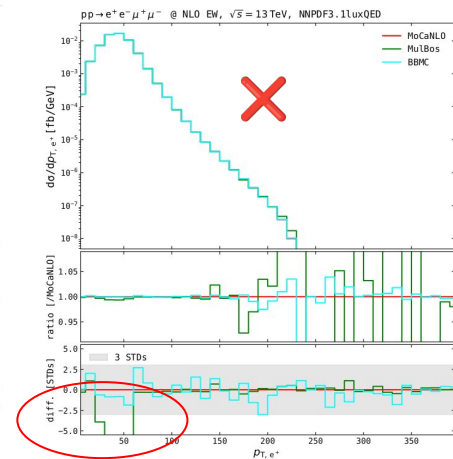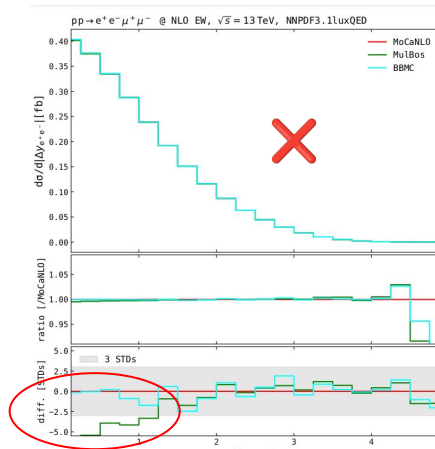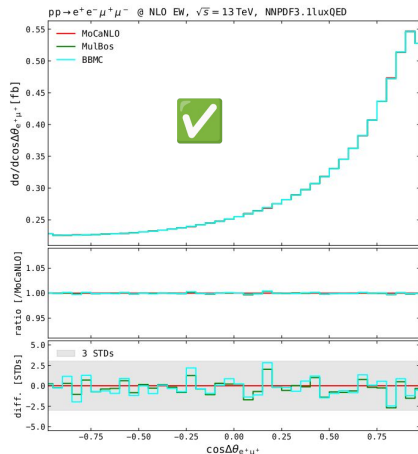
NLO QCD

code	OS approx.	full	unpol.	LL	LT	TL	TT
MoCaNLO	DPA	15.282(1)	15.158(2)	0.8899(3)	1.9313(5)	1.9243(2)	10.2095(9)
STRIPPER	DPA	15.284(3)	15.159(1)	0.8899(1)	1.9305(1)	1.9241(1)	10.2098(7)
MulBos	DPA	—	15.1575(9)	0.88997(6)	1.9305(1)	1.9240(1)	10.2106(6)
BBMC	DPA	15.284(1)	15.158(1)	0.8898(1)	1.9306(2)	1.9240(2)	10.2085(7)
PowHeg-Box	DPA	15.280(2)	15.156(2)	0.8909(2)	1.9306(4)	0.1.9239(5)	10.206(1)
Sherpa	NWA						
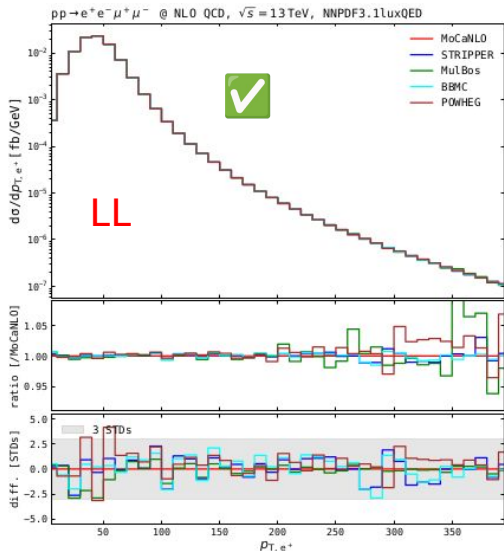
➔ **All DPA** calc's **agree** by less than 3 STDs at NLO QCD as well: for all (un)polarised states, Sherpa results to come soon

➔ low-pt(e+) deviation in MulBos not there at NLO QCD, still there in pt(4l)

➔ discrepancy in PWG (for decay angles, good agreement otherwise)

35