

# Higgs Cross-sections for ATLAS

- ★ **So far the Higgs Working Group in ATLAS has concentrated on discovery feasibility studies.**
- ★ **It was decided to use NLO corrections to Higgs production in those cases where backgrounds are also known to NLO**
  - **At this point this is the case for most of all the relevant discovery channels**
- ★ **ATLAS will producing a new Higgs discovery plot before turn on. This incorporates NLO corrections to signal processes and leading backgrounds**
- ★ **When data comes situation will change and we will need the best Higgs cross-sections predictions...**

# Cross-sections for $gg \rightarrow H$

$M_H$ (GeV)	$\sigma_{LO}$ (pb)	$\delta_{QCD}$	$\delta_{EW}$	$\sigma_{NLO}$ (pb)
100	27.788	0.80	0.04	51.264
105	25.518	0.80	0.04	47.189
110	23.519	0.81	0.05	43.590
115	21.748	0.81	0.05	40.412
120	20.170	0.81	0.05	37.579
125	18.759	0.81	0.06	35.050
130	17.491	0.82	0.06	32.809
135	16.348	0.82	0.06	30.735
140	15.314	0.82	0.07	28.886
145	14.375	0.82	0.07	27.207
150	13.521	0.82	0.08	25.680
155	12.741	0.83	0.08	24.283
160	12.029	0.83	0.07	22.854
165	11.376	0.83	0.05	21.363
170	10.776	0.84	0.03	20.114
175	10.224	0.84	0.03	19.050
180	9.715	0.84	0.02	18.080
185	9.246	0.84	0.01	17.096
190	8.812	0.85	-0.01	16.212
195	8.409	0.85	-0.01	15.447
200	8.038	0.85	-0.02	14.760

- **Including NLO QCD and EW corrections**
- **NNLO QCD corrections are available in the market but, following ATLAS standards, are not implemented in the note since backgrounds are known to NLO at best**
- **Nevertheless, we may want to include QCD NNLO corrections in the future, specially due to the prospects of Higgs limit determination when data comes**
- **Include in the future NLO QCD corrections to  $gg \rightarrow hj$  and  $gg \rightarrow hjj$**

