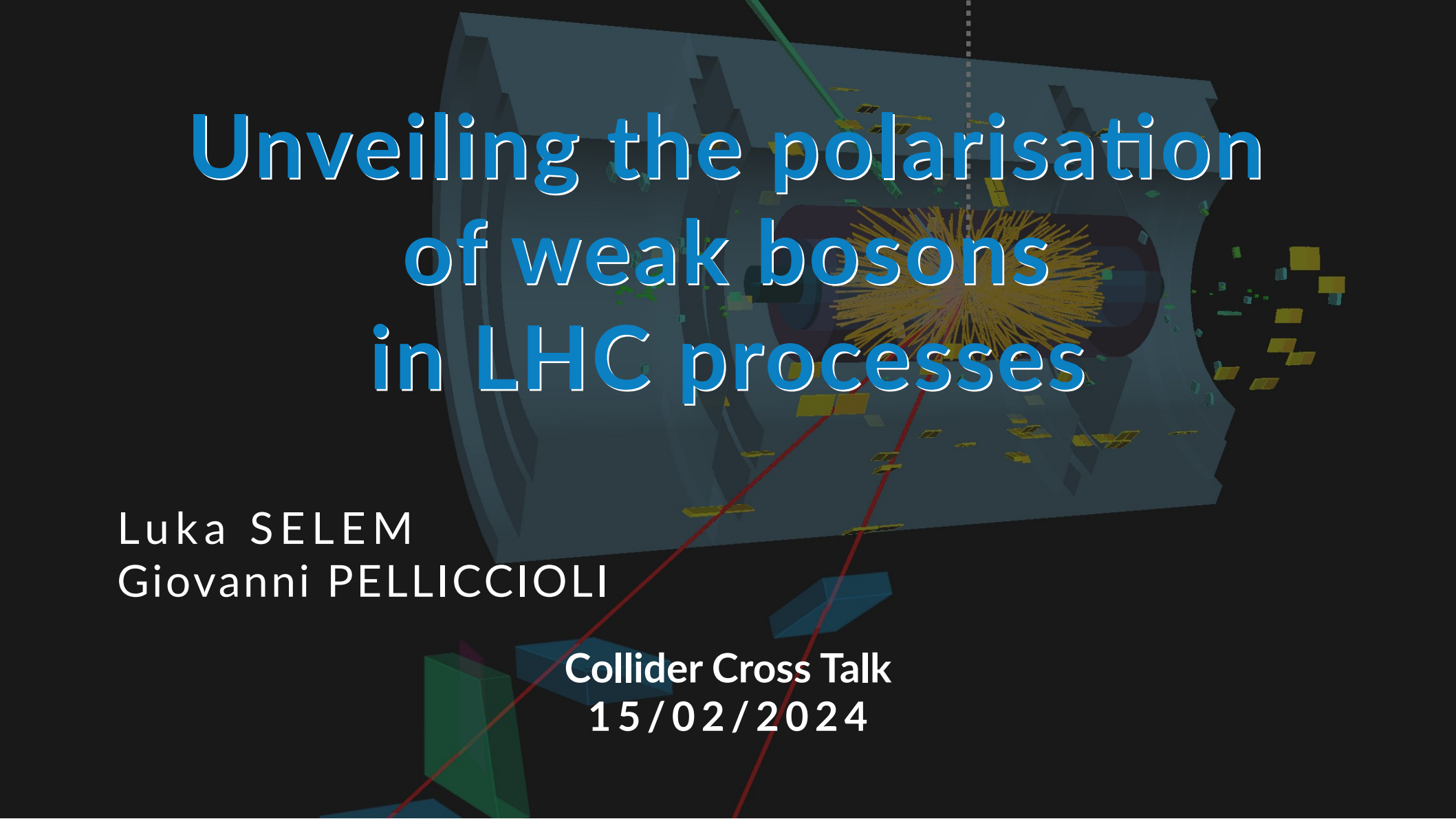
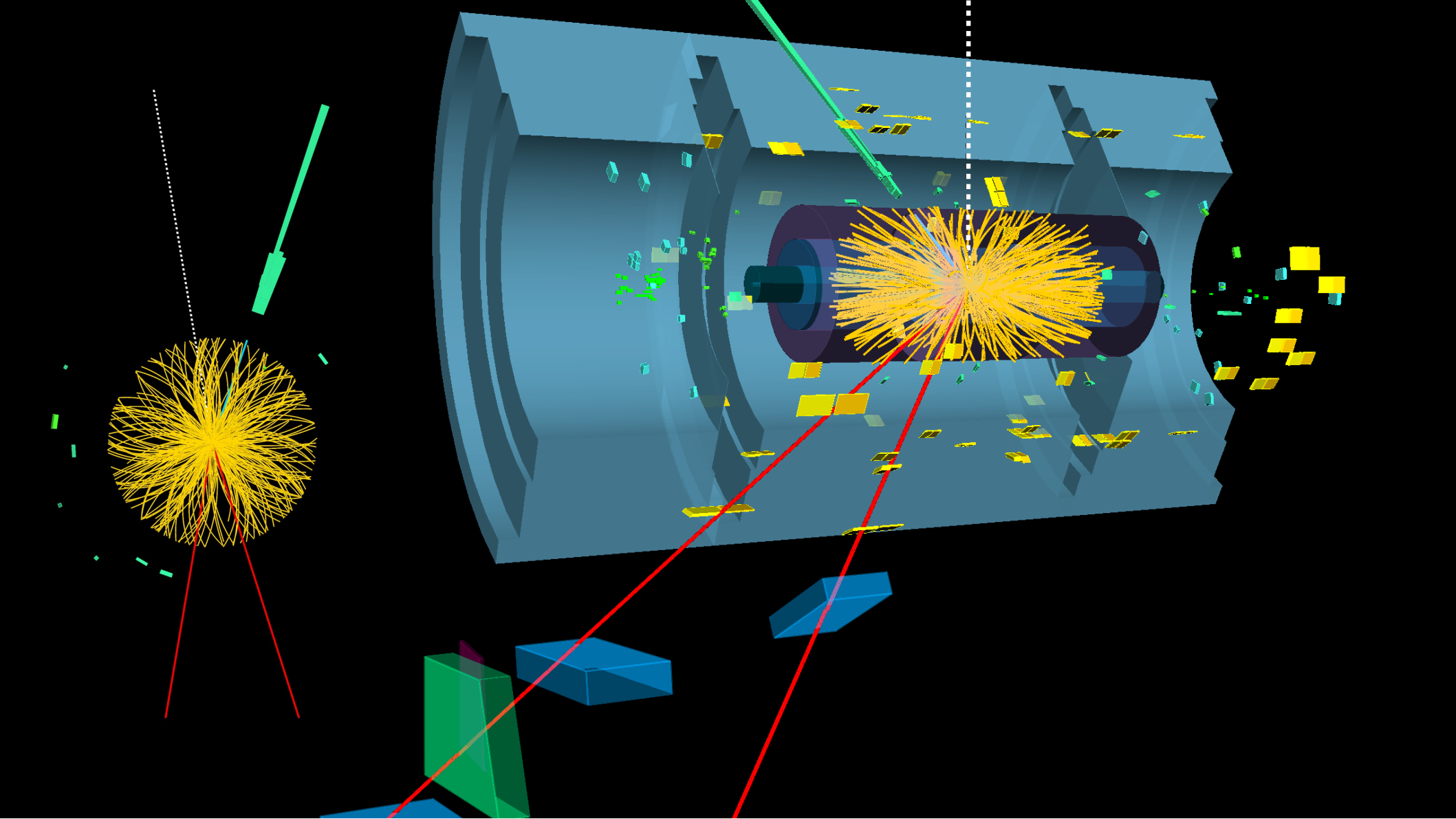


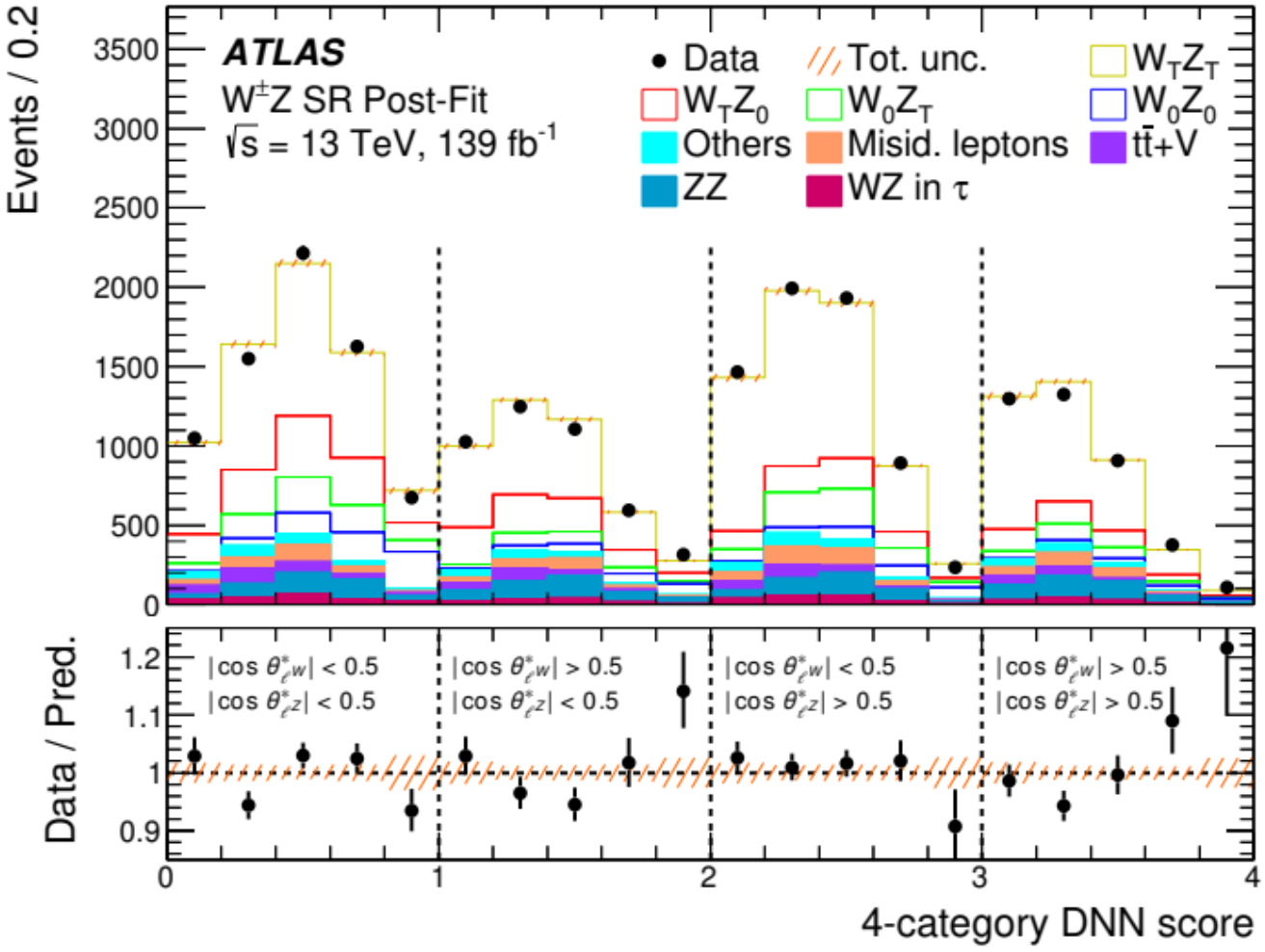
Unveiling the polarisation of weak bosons in LHC processes

Luka SELEM
Giovanni PELLICCIOLI

Collider Cross Talk
15/02/2024



Binned Maximum Likelihood Template Fit



Per charge of the W boson

W+ Z & W- Z

f_{00}	0 .067	±	0 .010
f_{0T}	0 .110	±	0 .029
f_{T0}	0 .179	±	0 .023
f_{TT}	0 .644	±	0 .032

f_{00} at **7.1σ**

W+ Z

f_{00}	0 .072	±	0 .016
f_{0T}	0 .119	±	0 .034
f_{T0}	0 .153	±	0 .033
f_{TT}	0 .66	±	0 .04

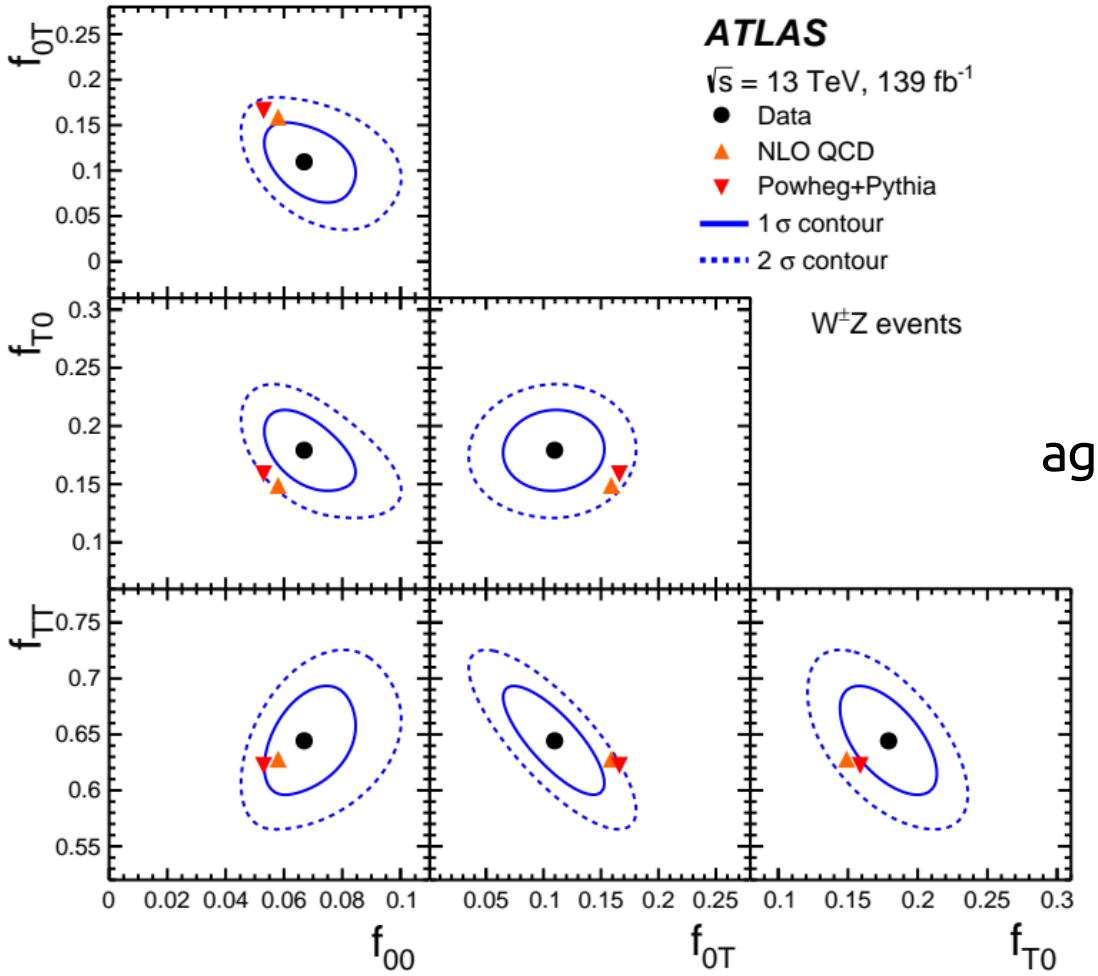
f_{00} at **6.9σ**

W- Z

f_{00}	0 .063	±	0 .016
f_{0T}	0 .11	±	0 .04
f_{T0}	0 .21	±	0 .04
f_{TT}	0 .62	±	0 .05

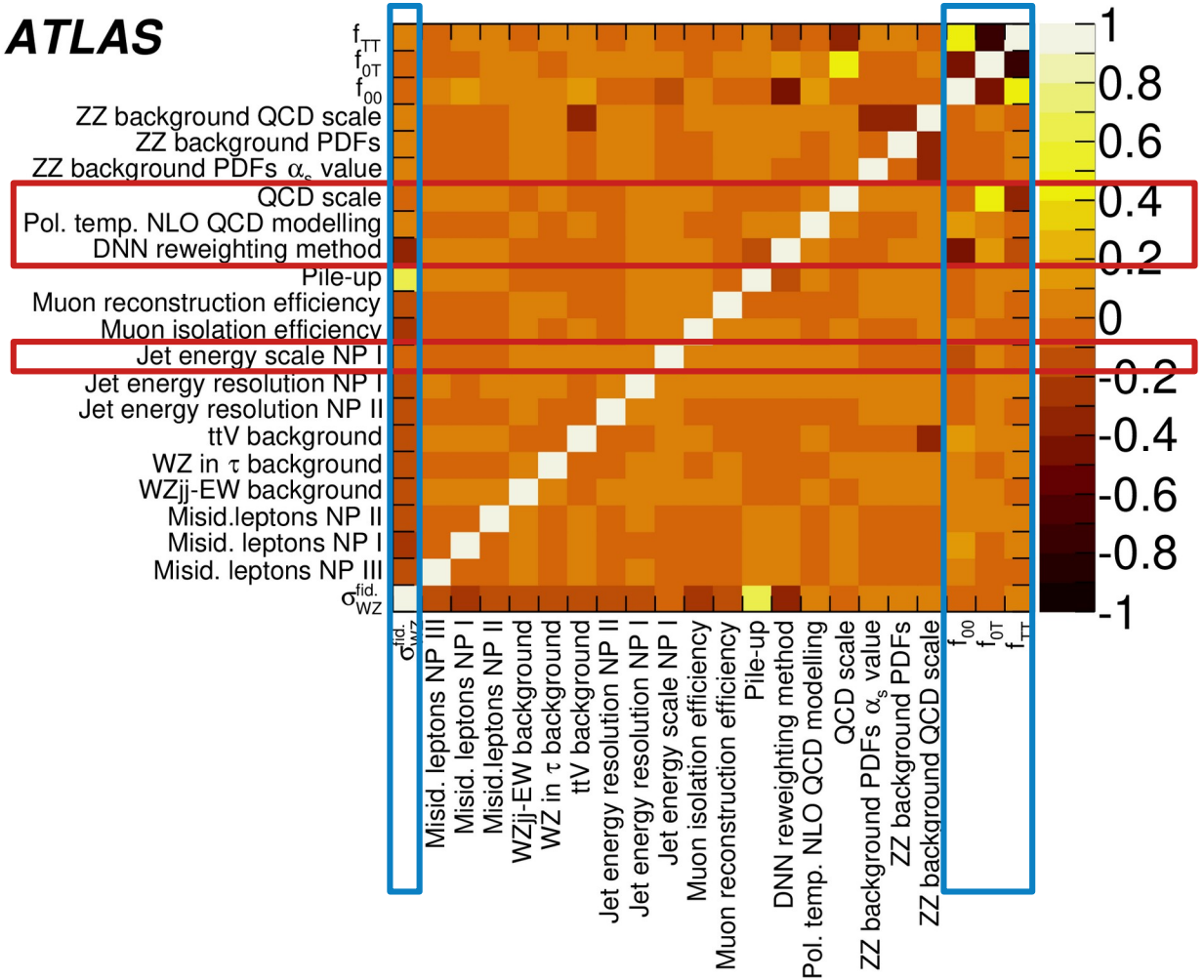
f_{00} at **4.1σ**

Joint-polarisation CL regions



1.4 σ global agreement with SM

Fit parameters correlations

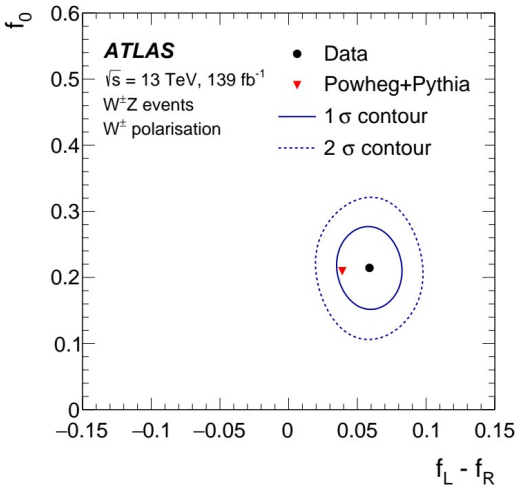


Parameters of interest

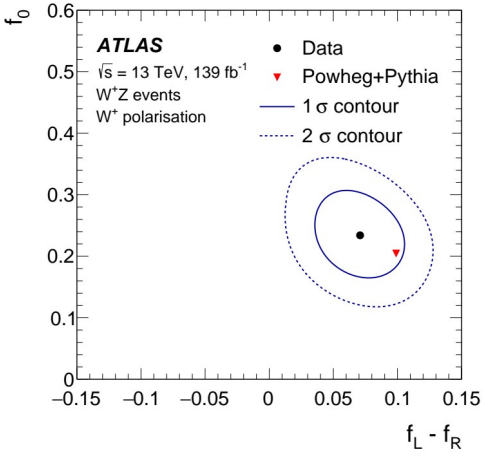
Higher order QCD

Single boson polarisation

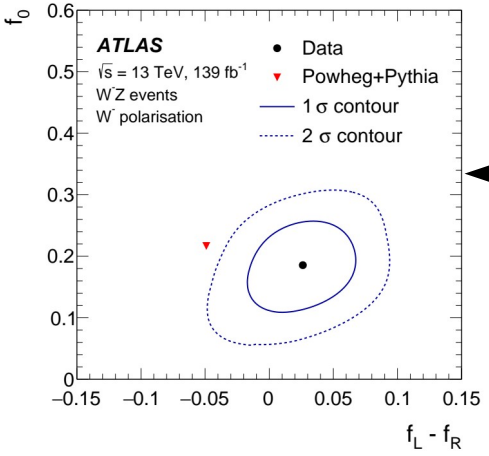
W boson



W⁺Z events

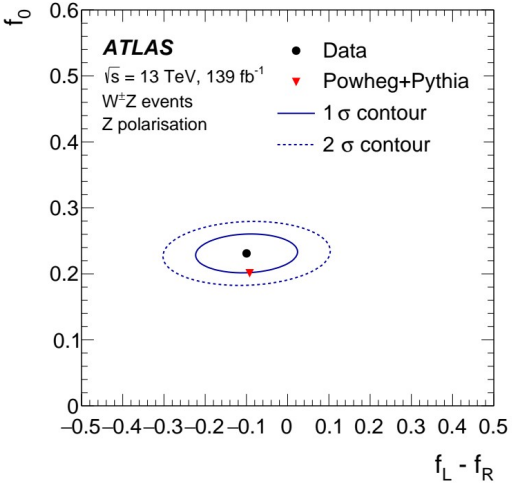


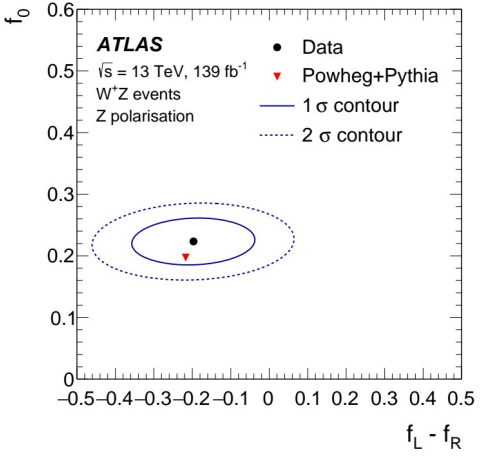
W⁻Z events

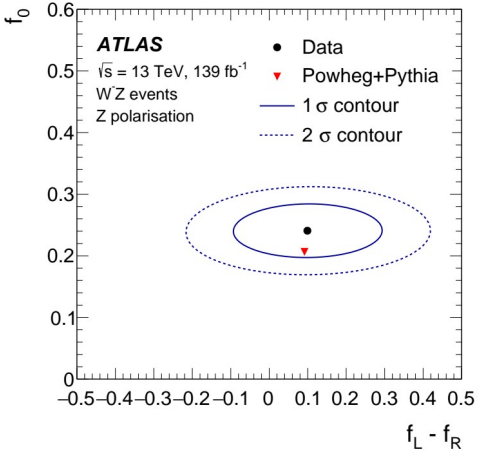


Tension at 2.3 σ

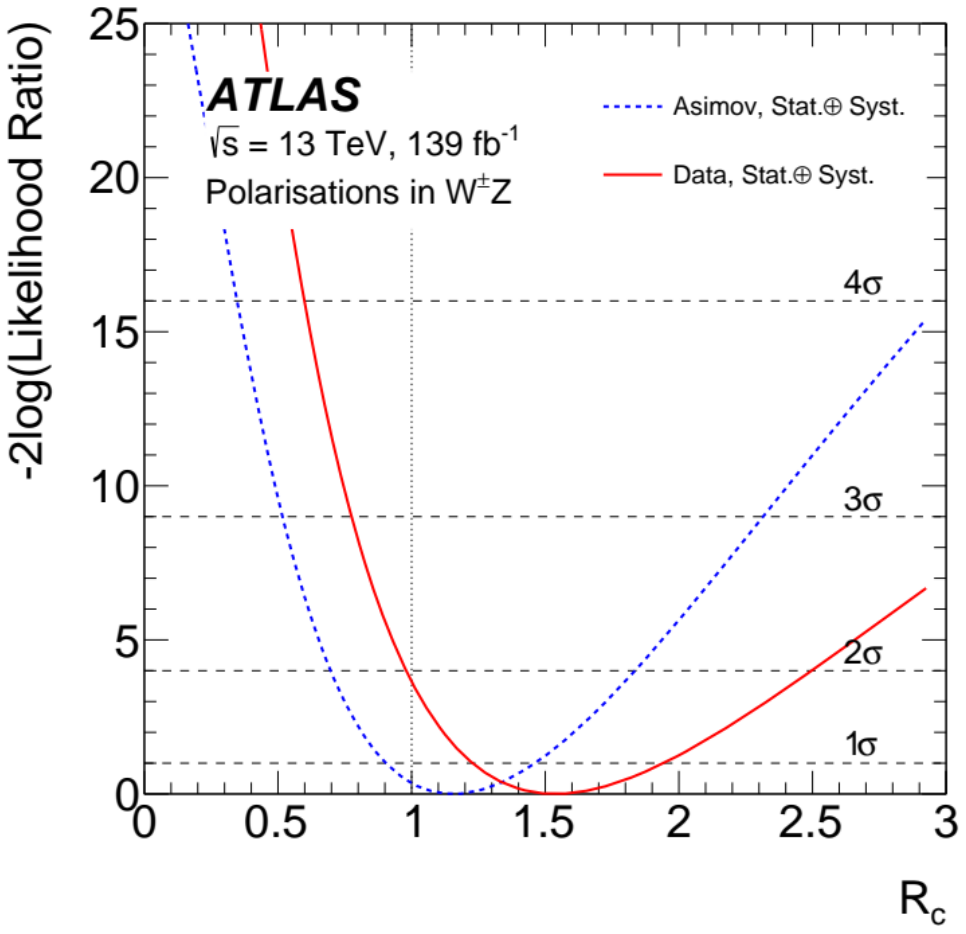
Z boson







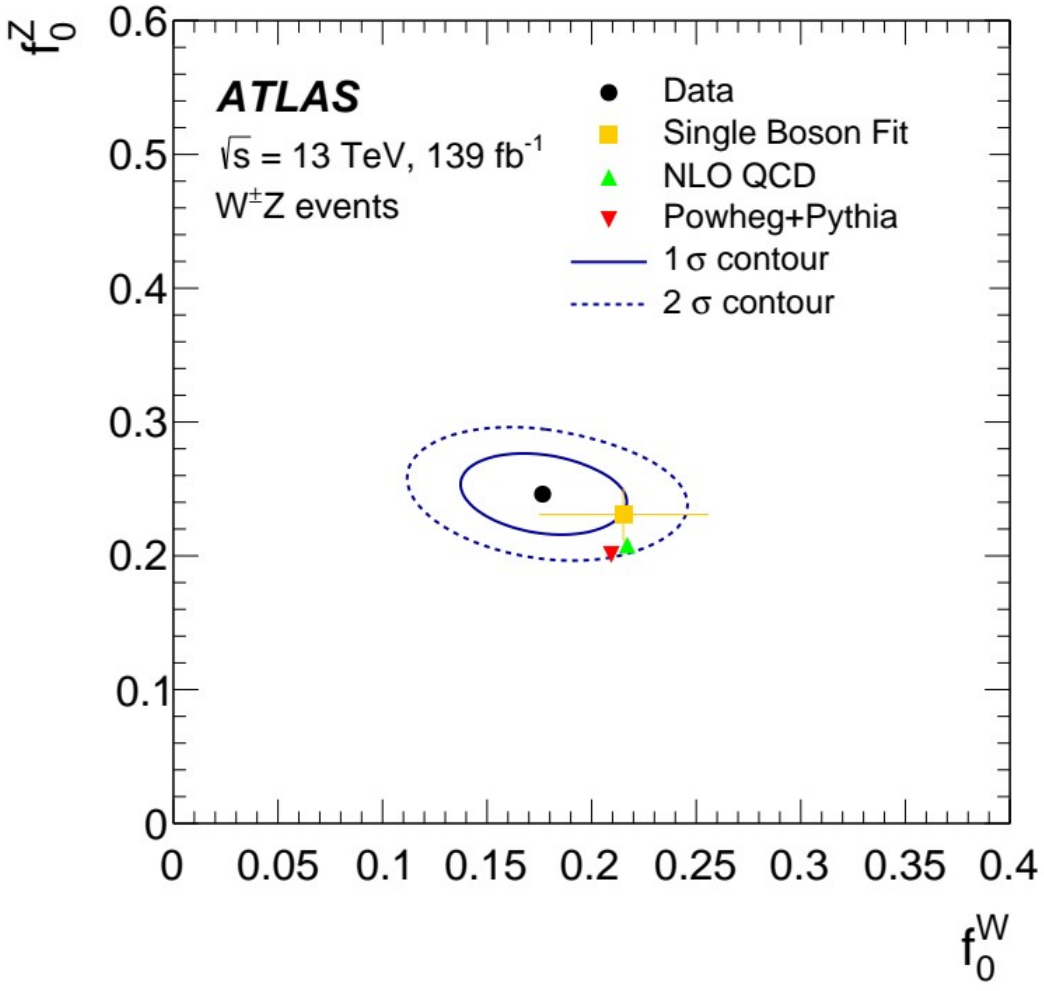
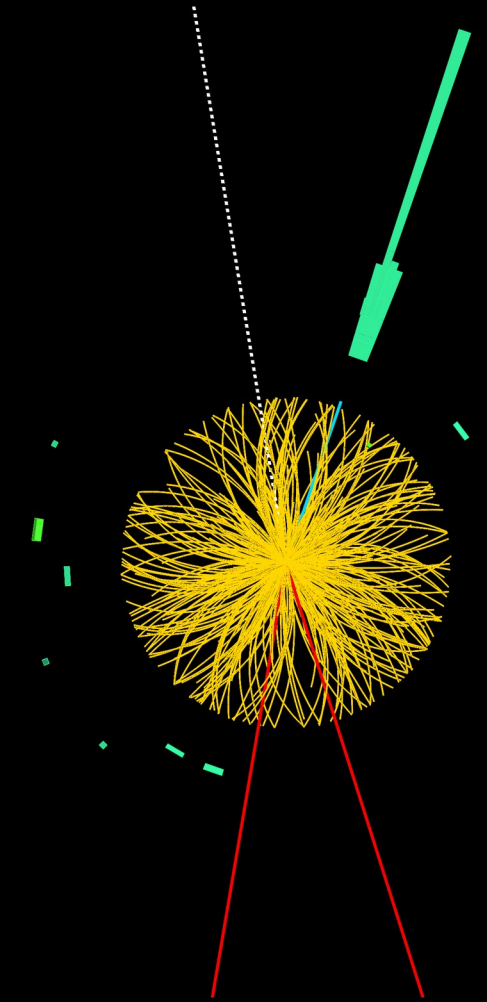
Independence test



Theory : $R_c \sim 1.3$

Measurement: $R_c = 1.54 \pm 0.35$

Consistency check



Thank you
for your attention !