





Bi-weekly updates

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DPG

- DPG slides in a (quite) final state, just minor updates on title slide and figure for introduction slide
- Talk next Tuesday 5:45pm





Collection of sensitivities

- \blacksquare Procedure as described for all of the 25 observables
- Organised in matrix and most sensitive observable per operator highlighted in red
- Production: Several processes dominated by $t\bar{t}$ production

Γ	$A_{FB} = \sigma_{t\bar{t}}$	0.0	$\frac{1.149}{2.281}$	$\frac{0.873}{1.806}$	$0.0 \\ 0.0$	$0.049 \\ 0.019$	$\frac{0.072}{0.014}$	$0.388 \\ 0.783$	$\frac{1.669}{1.094}$	0.98 0.708				
н	$\sigma_{t\bar{t}b\bar{b}}$	0.003	2.196	1.743	0.0	0.022	0.009	0.812	0.98	0.627	-	-12.5		
н	$\sigma_{t\bar{t}\ell\bar{t}}$		2.187	1.715				0.681	0.971	0.642				
	$\sigma_{t\overline{t}+q/q}$		1.451	1.149				1.097		0.119				
	σ_t	0.0	0.598	0.0		0.003	0.0	0.0	0.0	0.0			~	~
	Γ,											-10.0	C	>
	$F_{\rm B}$											10.0	1	
	$F_{\rm L}$													~
	F_0												— С)
	B_{r^-}												_	í
	B_{c^*}											-7.5	N	
	B_{k}							13.894					<u> </u>	5
	$\stackrel{B_{k^-}}{\stackrel{B_{k^+}}{\stackrel{C_k}{C_k}}}$							12.474					~	MS
	C_k													0
	C_{nr}											-5.0	0	
	$-C_r$											0.0	<u> </u>	
	C_{rk}												~	×
	C_{kn}												0	X
	C_n										1			
	C_{nn}										1 1	2.5		
	C_{rr}										1			
	C_{kk}										1			
	$A_{\cos(\varphi)}^{ao}$										1			
	$\stackrel{-}{\underset{\substack{C_{kk}\\A^{lab}_{(\varphi)}}{}}{C_{kk}}} A^{lab}_{ \Delta\phi_{\ell\ell} }$	0.0	0.137	0.208	0.0	0.0	0.0	0.655	0.176	0.175		-0		
		\mathcal{O}_{tG}	\mathcal{O}_{tW}	\mathcal{O}_{tZ}	$\mathcal{O}_{\varphi q}^{(3)}$	$\mathcal{O}_{\varphi q}^{(-)}$	$\mathcal{O}_{\varphi t}$	$\mathcal{O}_{te}^{(1)}$	$\mathcal{O}_{tl}^{(1)}$	$\mathcal{O}_{qe}^{(1)}$				





Collection of sensitivities

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- Production: Several processes dominated by $t\bar{t}$ production
- Decay: Predominantly via Wtb vertex → modification via C_{tW} and $C_{\varphi q}^{(3)}$

$\begin{array}{c} A_{\rm FB} \\ \sigma_{tit} \\ \sigma_{titit} \\ \sigma_{titit} \\ \sigma_{t} \\ F_{\rm R} \\ F_{\rm L} \\ B_{\rm r}^- \\ B_{\rm r}^- \\ B_{\rm r}^+ \\ B_{\rm r}^+ \\ C_{\rm r} \\ B_{\rm r}^+ \\ C_{\rm r} \\ C_{\rm r$	$\begin{array}{c} 0.0\\ 0.00\\ 0.003\\ 0.087\\ 0.0\\ 0.087\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.$	$\begin{array}{c} 1.149\\ 2.281\\ 2.196\\ 2.187\\ 1.451\\ 0.598\\ 0.166\\ 0.133\\ 0.206\\ 0.086\\ 1.024\\ 1.229\\ 2.337\\ 2.249\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.$	$\begin{array}{c} 0.873\\ 1.806\\ 1.743\\ 1.715\\ 1.149\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 1.481\\ 1.777\\ 5.872\\ 6.539\\ 0.0\\ 0.0\\ 0.125\\ 0.0\\ 0.0\\ 0.125\\ 0.0\\ 0.0\\ 0.125\\ 0.293\\ 0.18\\ 0.293\\ 0.18\\ 0.293\\ 0.18\\ 0.293\\ 0.293\\ 0.38\\ 0.298\\ 0.208\\ $	$\begin{array}{c} 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.235\\ 0.121\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.$	0.049 0.019 0.02 0.05 0.05 0.05 0.0 0.0 0.0 0.0 0.0 0.0	$\begin{array}{c} 0.072\\ 0.014\\ 0.009\\ 0.0\\ 0.032\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.$	$\begin{array}{c} 0.388\\ 0.783\\ 0.812\\ 0.681\\ 1.097\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 2.308\\ 2.128\\ 13.894\\ 12.478\\ 0.0\\ 0.0\\ 0.064\\ 0.0\\ 0.064\\ 0.06\\ 0.064\\ 0.063\\ 0.053\\ 0.328\\ 0.655\\ \end{array}$	$\begin{array}{c} 1.669\\ 1.094\\ 0.98\\ 0.971\\ 0.052\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 1.242\\ 1.658\\ 8.444\\ 7.614\\ 7.614\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.$	$\begin{array}{c} 0.98\\ 0.708\\ 0.642\\ 0.119\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.00\\ 0.00\\ 0.106\\ 0.442\\ 0.585\\ 0.641\\ 0.0\\ 0.585\\ 0.641\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.0\\ 0.$	-5.0 -2.5	$\partial O - O^{SM} _{C} = 0$
C_{ii}										-0	

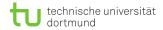




Collection of sensitivities

- Procedure as described for all of the 25 observables.
- Organised in matrix and most sensitive observable per operator highlighted in red
- Production: Several processes dominated by $t\bar{t}$ production
- Decay: Predominantly via Wtb vertex \rightarrow modification via C_{tW} and $C_{\varphi q}^{(3)}$
- Both: Composition of production and decay

$A_{\rm FB}$	0.0	1.149	0.873	0.0	0.049	0.072	0.388	1.669	0.98	
$\sigma_{t\bar{t}}$									0.708	
$\sigma_{t\bar{t}b\bar{b}}$									0.627	-12.5
$\sigma_{t\bar{t}\ell\bar{\ell}}$									0.642	
$\sigma_{t\overline{t}+q/g}$									0.119	
σ_t									0.0	\sim
Γ,									0.0	-10.0
$F_{\rm B}$									0.0	-10.0
F_{L}^{n}									0.0	
F_0									0.0	U Č
B_{r^-}	0.0	1.024	1.481	0.0	0.0	0.0	2.308	1.242	0.106	-
B_{r^+}		1.229					2.128	1.658	0.442	-7.5 🔀
$\begin{array}{c}B_{k}^{-}\\B_{k}^{+}\\C_{k}\end{array}$							13.894	8.444	0.585	^I S
$B_{\mu^+}^{"}$		2.249					12.474		0.641	O NS
\hat{C}_k			0.0				0.0	0.0	0.0	
C_{nr}									0.0	-5.0 0
$-C_r$									0.0	
C_{rk}			0.125						0.047	- ***
C_{kn}	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
C_n									0.0	1.0
C_{nn}									0.581	-2.5
C_{TT}		0.121	0.125				0.068	0.121	0.108	
C_{kk}			0.293						0.104	
$A_{\alpha\alpha}^{(a)}$		0.131	0.18	0.0		0.0	0.328	0.196	0.03	
$\left. \begin{array}{c} \widetilde{C}_{kk} \\ \widetilde{C}_{kk} \\ A_{\mathrm{cos}(\varphi)}^{\mathrm{lab}\ kk} \\ A_{ \Delta\phi_{\phi} }^{\mathrm{cos}(\varphi)} \end{array} \right.$	0.0	0.137	0.208	0.0	0.0	0.0	0.655	0.176	0.175	
	O_{tG}	\mathcal{O}_{tW}	\mathcal{O}_{tZ}	(3)	(-)	$\mathcal{O}_{\varphi t}$	(1)	(1)	(1)	·
	- tG	-iW	-tZ	$\mathcal{O}_{\varphi q}^{(\circ)}$	$\mathcal{O}_{\varphi q}^{(-)}$	- qt	\mathcal{O}_{te}	\mathcal{O}_{tl}	\mathcal{O}_{qe}	
				$O_{\varphi q}$	$O_{\varphi q}$		O_{te}	O_{tl}	O_{qe}	





FCC meeting & samples

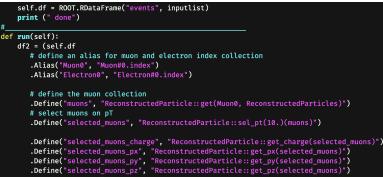
- Attended the FCC-ee working group meeting:
 - Quite small audience (~ 25 participants)
 - Seem to be happy for any contribution to the FCC studies
 - Something like DPG presentation planned for next meeting in a month
- Got access to first processed samples on /eos
 - Selected $e^+e^- \rightarrow t\bar{t} \rightarrow \text{everything}$ sample with 100k events $@\sqrt{s} = 365 \text{ GeV}$
 - \rightarrow Comparable to our samples
 - \rightarrow Observables at $C_i = 0$ also similar?
 - Strategy for further processing the samples





FCC samples

- Samples available on reconstruction level
- **FCCAnalyses** provides software for analysis of FCC samples
- Conversion script as highlighted in their tutorial to convert samples to RDataFrame (tutorials here) called analysis.py:



User asks for kinematic variables of leptons, jets, MET,...

```
→ Results in .root file with RDataFrame structure
```





FCC samples - processed

