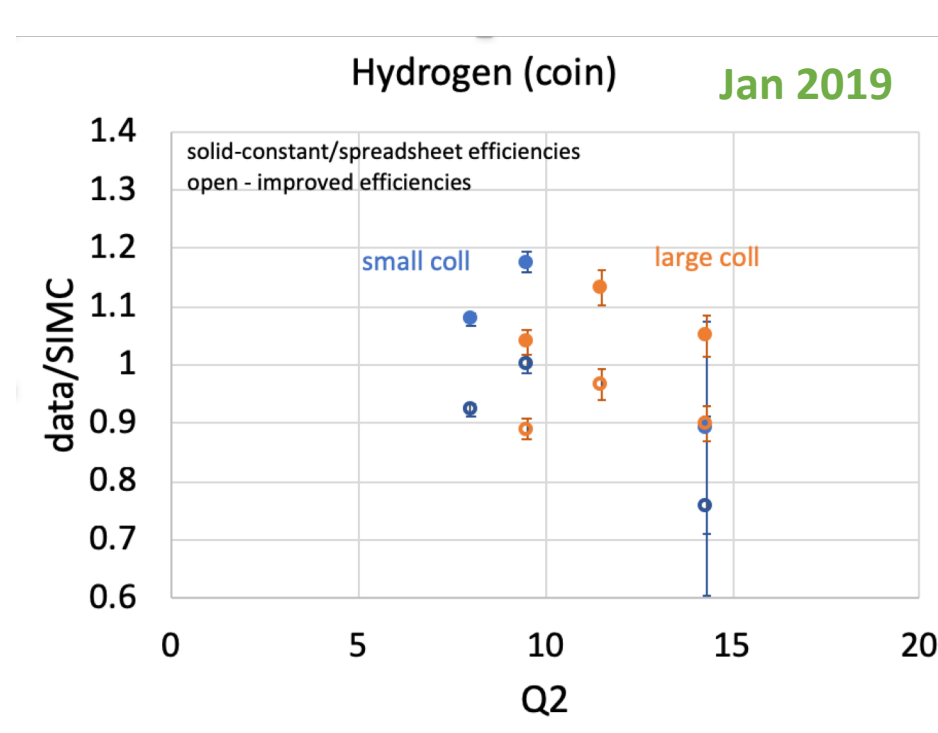
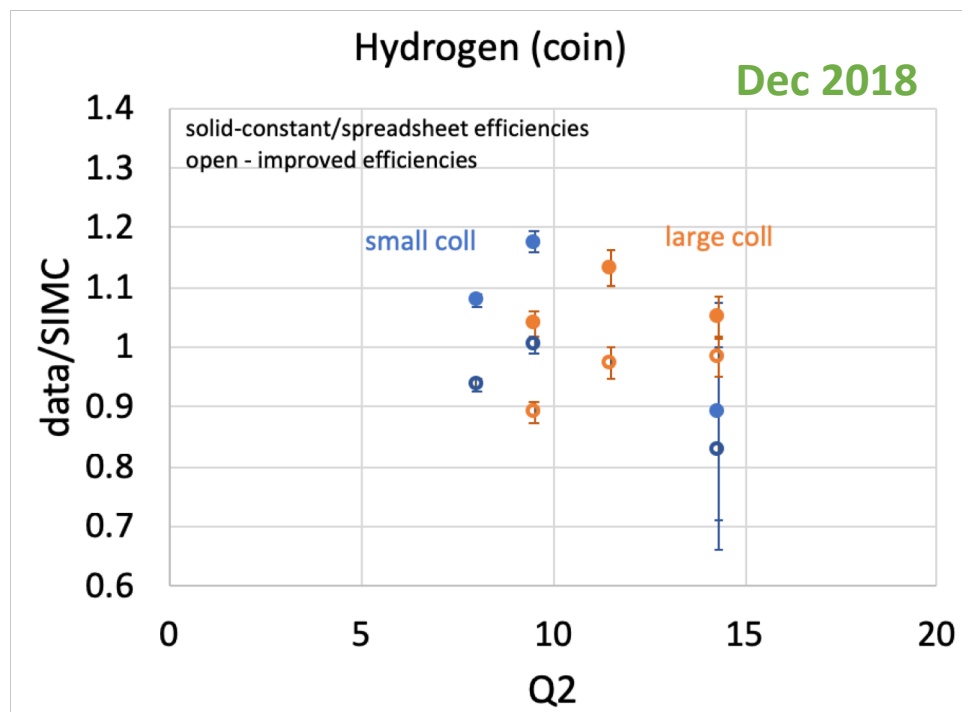


Preliminary look at Pass 1 hydrogen and even some carbon

25 Jan 2019

Here I compare the data/SIMC ratios from the efficiencies in Dec 2018 to the latest in Jan 2019. Overall, we still have a problem with the Q2=8 hydrogen setting.

General event selection cuts: `P.gtr.beta>0.6 && P.gtr.beta<1.4 && H.gtr.beta>0.8 && H.gtr.beta<1.2 &&
H.cer.npeSum>0. && H.cal.etottracknorm >0.8 && H.cal.etottracknorm<1.15 &&
P.hod.goodstarttime == 1 && H.hod.goodstarttime ==1 &&
H.gtr.dp > -8 && H.gtr.dp < 8 && P.gtr.dp > -10 && P.gtr.dp < 20
&& (P.hgcer.npeSum < 0.1 || P.ngcer.npeSum<0.1)
&& abs(CTime.epCoinTime_ROC2)<2.5`



- Q2=8 point is still low (dead time?)
- Q2=9.5 point: used same efficiencies for small/large collimator, seems OK for small collimator but maybe wrong for large?
- Q2=11.5 dropped a bit with time cut
- Q2=14.3 looks good for large. Used same efficiency for small and large. Looks much worse with latest efficiencies (big tracking change).

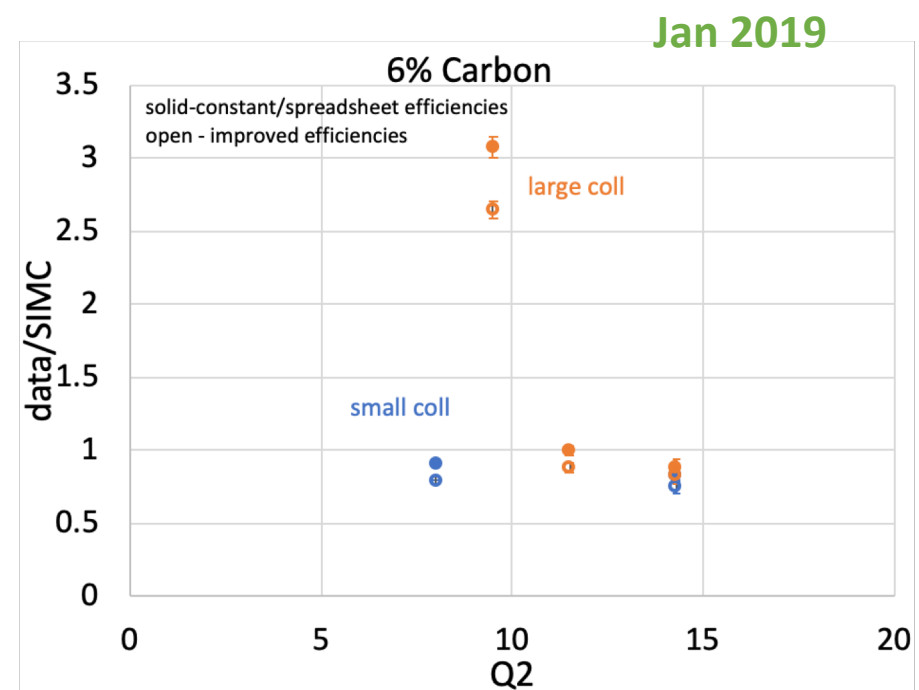
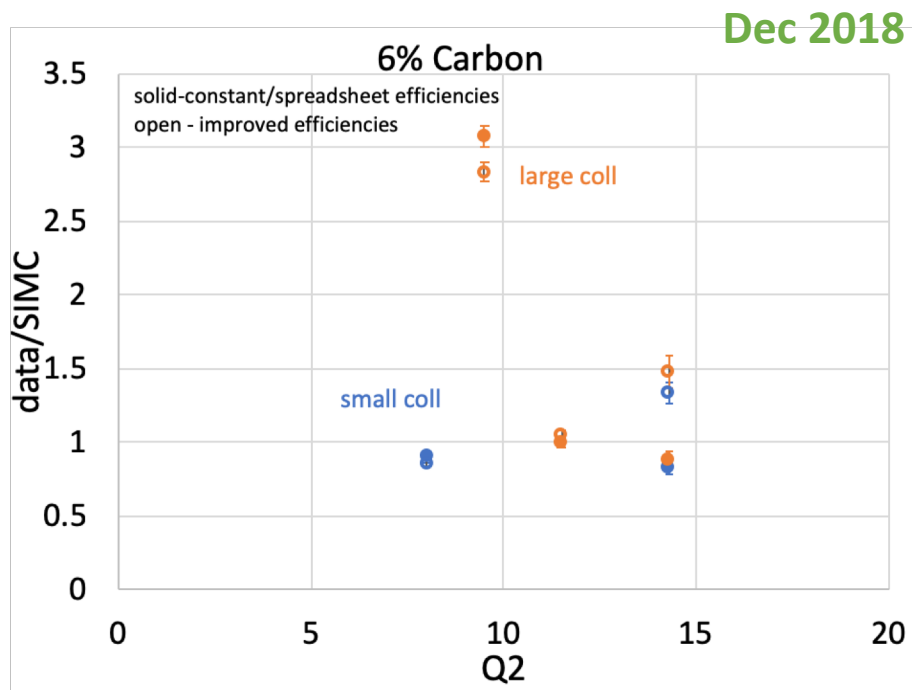
Physics cut: $W > 0.85$ & $|P_m| < 0.1$ & $E_m < 0.1$ & &

$Q^2 = 8$, $W < 1.03$

$Q^2 = 9.5$, $W < 1.04$

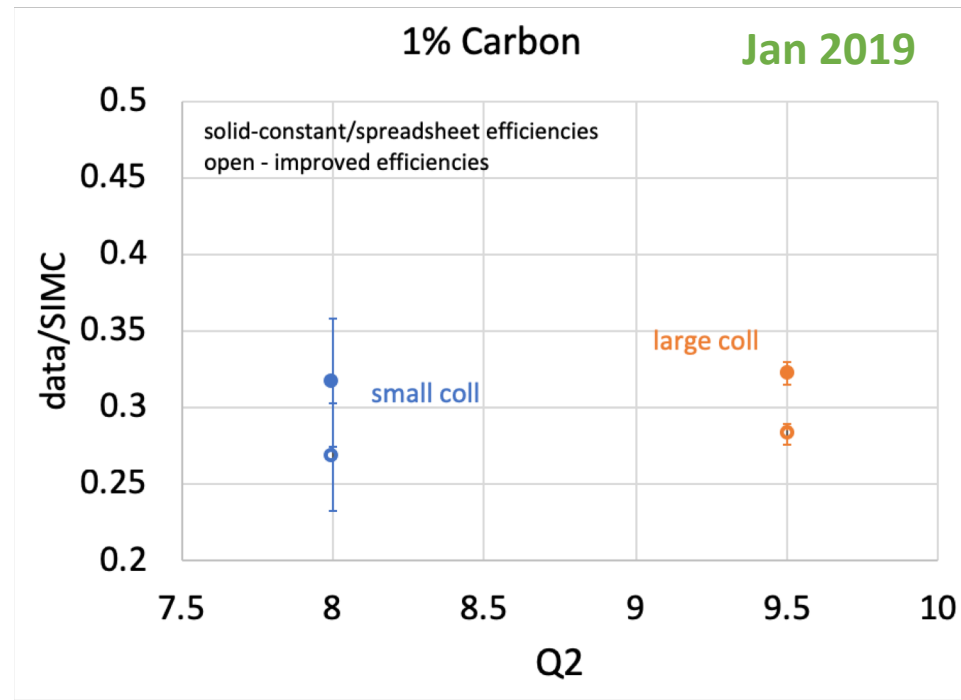
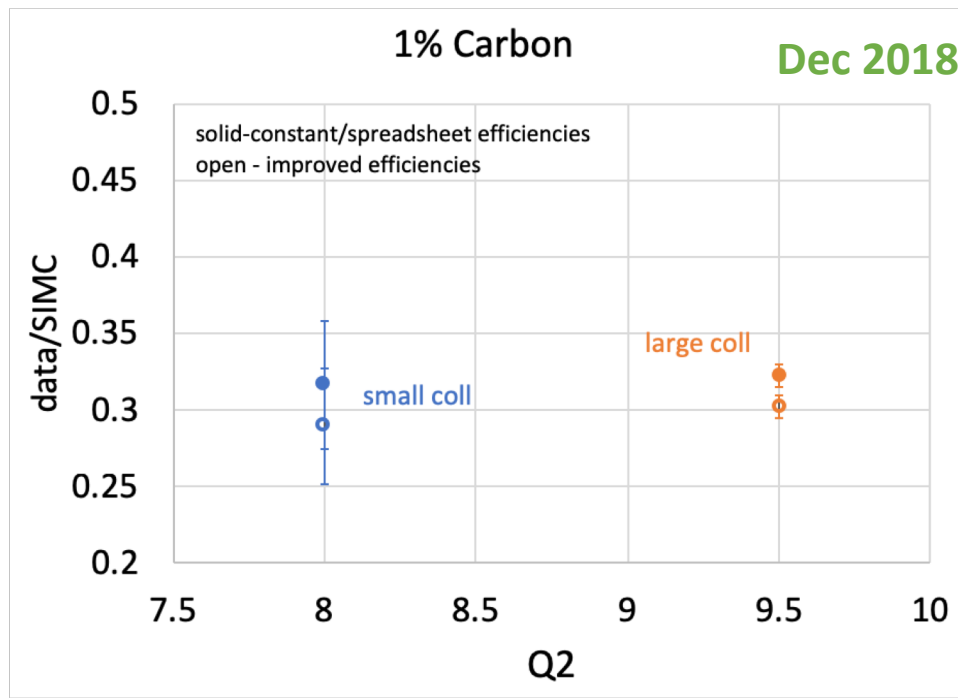
$Q^2 = 11.5$, $W < 1.05$

$Q^2 = 14.3$, $W < 1.06$



- I wasn't worried so much about the magnitude, as I just wanted to see what the general trend is and how the efficiencies affect the ratio
- No physics corrections here other than efficiencies
- Q2=9.5 looks very weird...since there is one carbon efficiency at this setting, is this due to using efficiencies associated with the 1.5% C?
- Need to know which target the efficiency corrections were done at Q2=8 (used the same for both 6% and 1.5% C).
- Small and Large collimator corrections look consistent at Q2=14.3...interesting!

Physics cut: $E_m < 0.08$ & $|P_m| < 0.3$



- These seem somewhat more consistent with each other (no funny business here at $Q2=9.5$).
- Need to know which target the efficiency corrections were done at $Q2=8$ (used the same for both 6% and 1.5% C).
- Are the relative differences between the 6% and 1.5% looking correct? About 70% different...
- Both data/SIMC ratios decreased with latest efficiencies.

Physics cut: $E_m < 0.08$ & $|P_m| < 0.3$

Efficiencies I used:

Dec 2018

Target	Q^2	Spectrometer	Detector	Efficiency	Uncertainty
LH2	8	SHMS	Cherenkov	0.999032	0.000559
LH2	9.5	SHMS	Cherenkov	0.999658	0.000880
LH2	11.5	SHMS	Cherenkov	1.000000	0.003568
LH2	14.3	SHMS	Cherenkov	0.998976	0.004034
C12	8	SHMS	Cherenkov	0.999109	0.001082
C12	9.5	SHMS	Cherenkov	0.999143	0.001031
C12	11.5	SHMS	Cherenkov	0.998362	0.003365
C12	14.3	SHMS	Cherenkov	0.996266	0.005705
LH2	8	HMS	Calorimeter	0.994773	0.001087
LH2	9.5	HMS	Calorimeter	0.995563	0.001347
LH2	11.5	HMS	Calorimeter	0.997608	0.004757
LH2	14.3	HMS	Calorimeter	0.995447	0.006794
C12	8	HMS	Calorimeter	0.987822	0.002119
C12	9.5	HMS	Calorimeter	0.987517	0.001789
C12	11.5	HMS	Calorimeter	0.968684	0.005671
C12	14.3	HMS	Calorimeter	0.974724	0.008453
LH2	8	HMS	Cherenkov	0.999189	0.000707
LH2	9.5	HMS	Cherenkov	0.995907	0.001310
LH2	11.5	HMS	Cherenkov	0.998785	0.004623
LH2	14.3	HMS	Cherenkov	1.000000	0.006252
C12	8	HMS	Cherenkov	0.990160	0.001981
C12	9.5	HMS	Cherenkov	0.989085	0.001719
C12	11.5	HMS	Cherenkov	0.997652	0.003560
C12	14.3	HMS	Cherenkov	0.989738	0.007367

Jan 2019

Target	Q^2	Spectrometer	Detector	Efficiency	Uncertainty
LH2	8	SHMS	Cherenkov	0.998132	0.000001
LH2	9.5	SHMS	Cherenkov	0.999567	0.000002
LH2	11.5	SHMS	Cherenkov	1.000000	0.000033
LH2	14.3	SHMS	Cherenkov	0.998997	0.000028
C12	8	SHMS	Cherenkov	0.998197	0.000004
C12	9.5	SHMS	Cherenkov	0.999012	0.000004
C12	11.5	SHMS	Cherenkov	0.996756	0.000039
C12	14.3	SHMS	Cherenkov	0.994918	0.000073
LH2	8	HMS	Calorimeter	0.994955	0.000004
LH2	9.5	HMS	Calorimeter	0.995529	0.000005
LH2	11.5	HMS	Calorimeter	0.997609	0.000073
LH2	14.3	HMS	Calorimeter	0.995397	0.000132
C12	8	HMS	Calorimeter	0.987320	0.000016
C12	9.5	HMS	Calorimeter	0.987345	0.000011
C12	11.5	HMS	Calorimeter	0.970305	0.000103
C12	14.3	HMS	Calorimeter	0.974512	0.000231
LH2	8	HMS	Cherenkov	0.999200	0.000001
LH2	9.5	HMS	Cherenkov	0.995713	0.000005
LH2	11.5	HMS	Cherenkov	0.998792	0.000069
LH2	14.3	HMS	Cherenkov	1.000000	0.000116
C12	8	HMS	Cherenkov	0.989812	0.000014
C12	9.5	HMS	Cherenkov	0.989024	0.000010
C12	11.5	HMS	Cherenkov	0.997254	0.000042
C12	14.3	HMS	Cherenkov	0.991852	0.000157

Dec 2018

Target	Q^2	Spectrometer	Detector	Efficiency	Uncertainty
LH2	8	SHMS	Hodoscope 3/4	0.999881	0.000911
LH2	9.5	SHMS	Hodoscope 3/4	0.999908	0.00097
LH2	11.5	SHMS	Hodoscope 3/4	0.999933	0.002443
LH2	14.3	SHMS	Hodoscope 3/4	0.99899	0.005128
C12	8	SHMS	Hodoscope 3/4	0.989063	0.002344
C12	9.5	SHMS	Hodoscope 3/4	0.999123	0.001917
C12	11.5	SHMS	Hodoscope 3/4	0.993994	0.005848
C12	14.3	SHMS	Hodoscope 3/4	0.869322	0.007787
LH2	8	HMS	Hodoscope 3/4	1	0.000291
LH2	9.5	HMS	Hodoscope 3/4	1	0.000365
LH2	11.5	HMS	Hodoscope 3/4	1	0.001918
LH2	14.3	HMS	Hodoscope 3/4	1	0.002291
C12	8	HMS	Hodoscope 3/4	1	0.000514
C12	9.5	HMS	Hodoscope 3/4	1	0.000393
C12	11.5	HMS	Hodoscope 3/4	1	0.00129
C12	14.3	HMS	Hodoscope 3/4	1	0.001465
LH2	8	HMS	Tracking	1	0.000146
LH2	9.5	HMS	Tracking	1	0.000184
LH2	11.5	HMS	Tracking	1	0.000968
LH2	14.3	HMS	Tracking	1	0.001151
C12	8	HMS	Tracking	1	0.000258
C12	9.5	HMS	Tracking	1	0.000198
C12	11.5	HMS	Tracking	1	0.000649
C12	14.3	HMS	Tracking	1	0.000736

Jan 2019

Target	Q^2	Spectrometer	Detector	Efficiency	Uncertainty
LH2	8	SHMS	Hodoscope 3/4	1	0.000306
LH2	9.5	SHMS	Hodoscope 3/4	1	0.000434
LH2	11.5	SHMS	Hodoscope 3/4	1	0.002089
LH2	14.3	SHMS	Hodoscope 3/4	1	0.002539
C12	8	SHMS	Hodoscope 3/4	1	0.000308
C12	9.5	SHMS	Hodoscope 3/4	1	0.00056
C12	11.5	SHMS	Hodoscope 3/4	1	0.001781
C12	14.3	SHMS	Hodoscope 3/4	1	0.001771
LH2	8	HMS	Hodoscope 3/4	1	0.000291
LH2	9.5	HMS	Hodoscope 3/4	1	0.000365
LH2	11.5	HMS	Hodoscope 3/4	1	0.001918
LH2	14.3	HMS	Hodoscope 3/4	1	0.002291
C12	8	HMS	Hodoscope 3/4	1	0.000514
C12	9.5	HMS	Hodoscope 3/4	1	0.000414
C12	11.5	HMS	Hodoscope 3/4	1	0.00129
C12	14.3	HMS	Hodoscope 3/4	1	0.001517
LH2	8	HMS	Tracking	1	0.000146
LH2	9.5	HMS	Tracking	1	0.000184
LH2	11.5	HMS	Tracking	1	0.000968
LH2	14.3	HMS	Tracking	1	0.001151
C12	8	HMS	Tracking	1	0.000258
C12	9.5	HMS	Tracking	1	0.000209
C12	11.5	HMS	Tracking	1	0.000649
C12	14.3	HMS	Tracking	1	0.000761

Dec 2018

Target	Q^2	Spectrometer	Detector	Efficiency	Uncertainty
LH2	8	SHMS	Tracking	0.896921	0.002464
LH2	9.5	SHMS	Tracking	0.940372	0.002324
LH2	11.5	SHMS	Tracking	0.927897	0.005765
LH2	14.3	SHMS	Tracking	0.859155	0.00768
C12	8	SHMS	Tracking	0.854955	0.002497
C12	9.5	SHMS	Tracking	0.87173	0.00314
C12	11.5	SHMS	Tracking	0.770706	0.00649
C12	14.3	SHMS	Tracking	0.516202	0.004622

Jan 2019

Target	Q^2	Spectrometer	Detector	Efficiency	Uncertainty
LH2	8	SHMS	Tracking	0.911167	0.002674
LH2	9.5	SHMS	Tracking	0.941592	0.002611
LH2	11.5	SHMS	Tracking	0.935129	0.006302
LH2	14.3	SHMS	Tracking	0.939678	0.006812
C12	8	SHMS	Tracking	0.914281	0.002555
C12	9.5	SHMS	Tracking	0.931546	0.003058
C12	11.5	SHMS	Tracking	0.917055	0.006069
C12	14.3	SHMS	Tracking	0.798127	0.008069