Comparison of Measured and Simulated Data using the Feynman Variance-to-Mean Method

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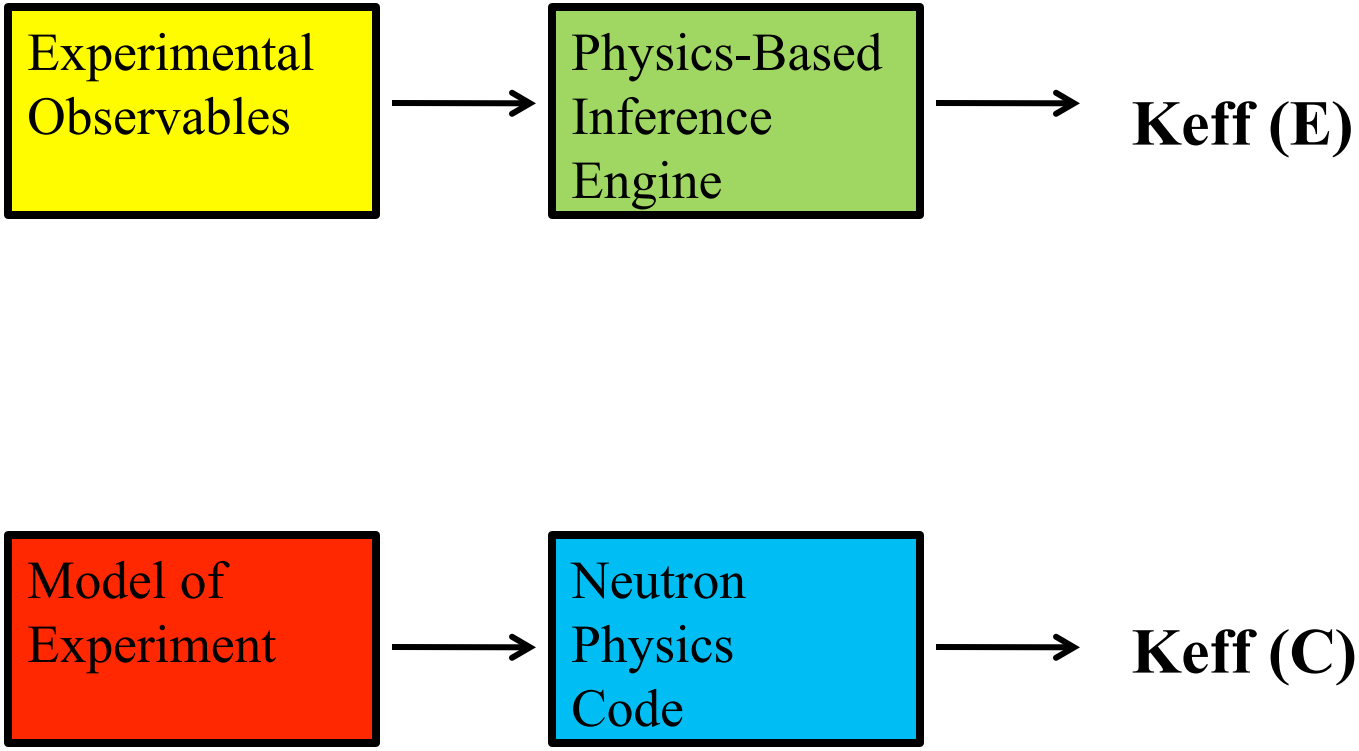
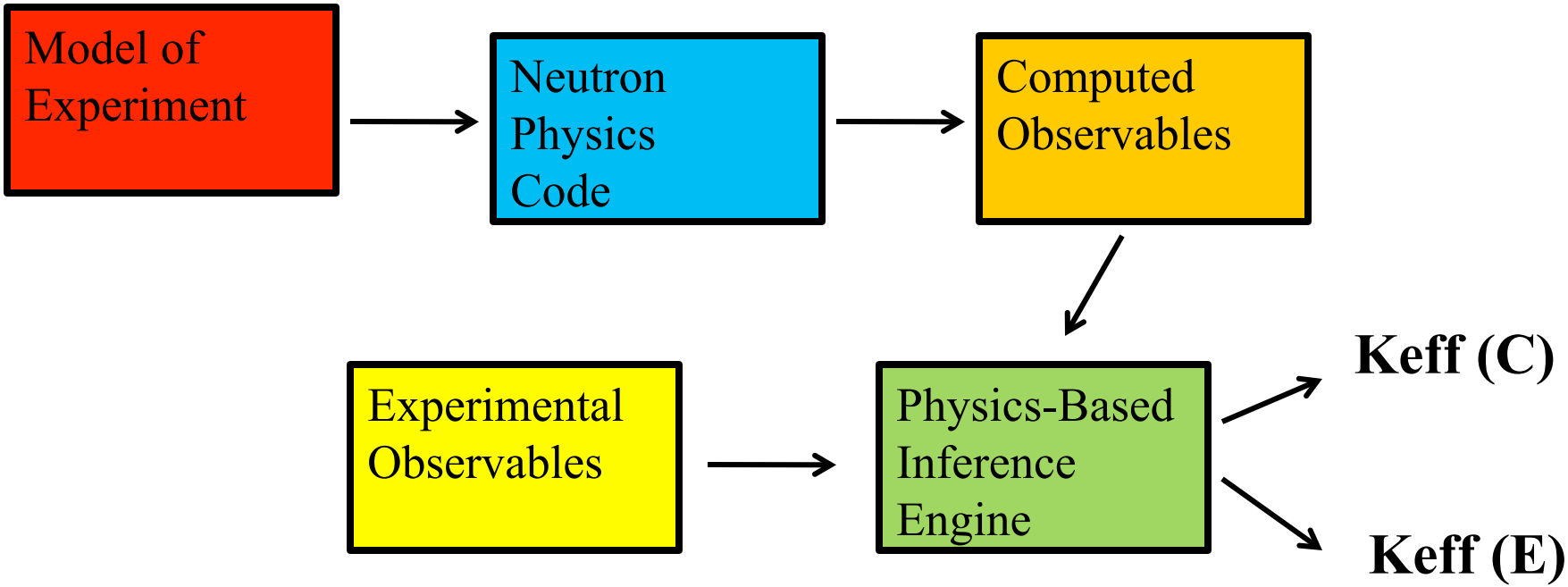
Measured and simulated analysis (1)



Measured and simulated analysis (2)



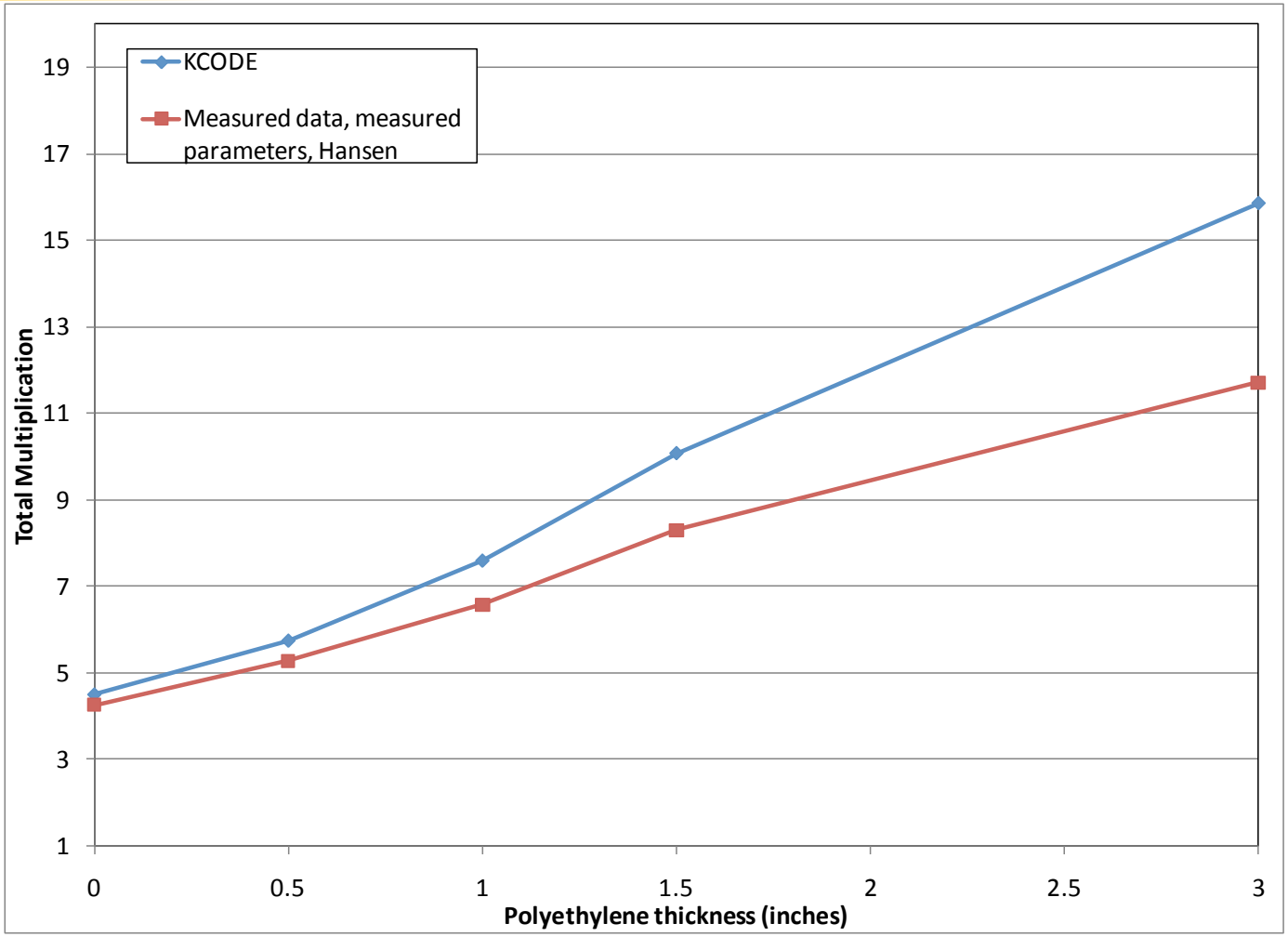
Configurations

- Data of the BeRP ball reflected by polyethylene.
- The face of the NPOD detector was 50 cm from the center of the BeRP ball.
- Measured data were reduced to match the simulation time (300 sec).

Data comparison

- Previously we were comparing two data sets:
  - MCNP KCODE
  - Measured data using measured parameters
- Measured parameters:
  - NSS (neutron source strength): taken from the SNAP detector.
  - Ψ (transmission): measured using ^{252}Cf replacement measurements.
- This is similar to the first flowchart.

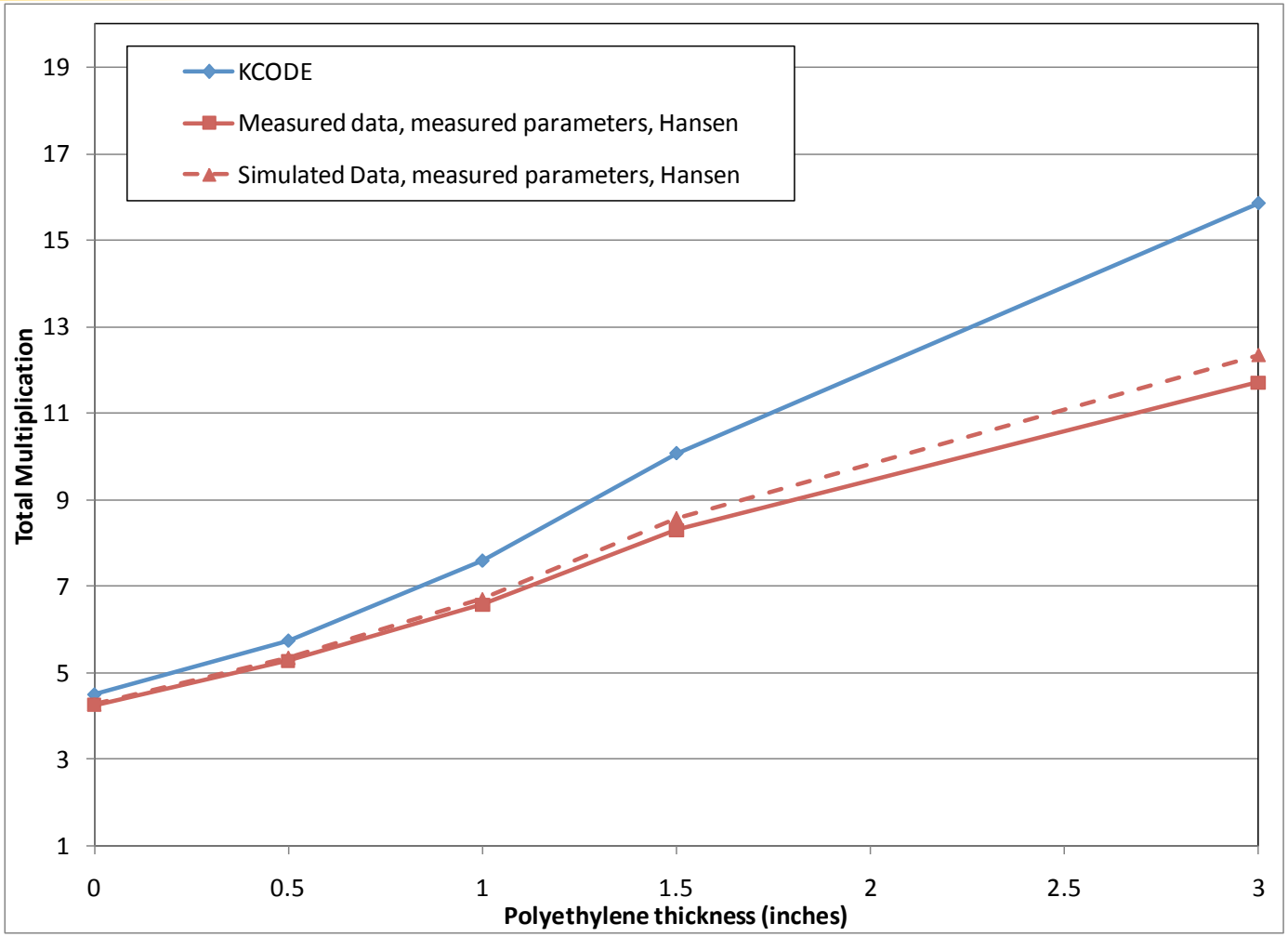
Data comparison



Data comparison

- Now we can compare similar data sets:
  - Measured data using measured parameters
  - Simulated data using measured parameters
- This is similar to the second flowchart.

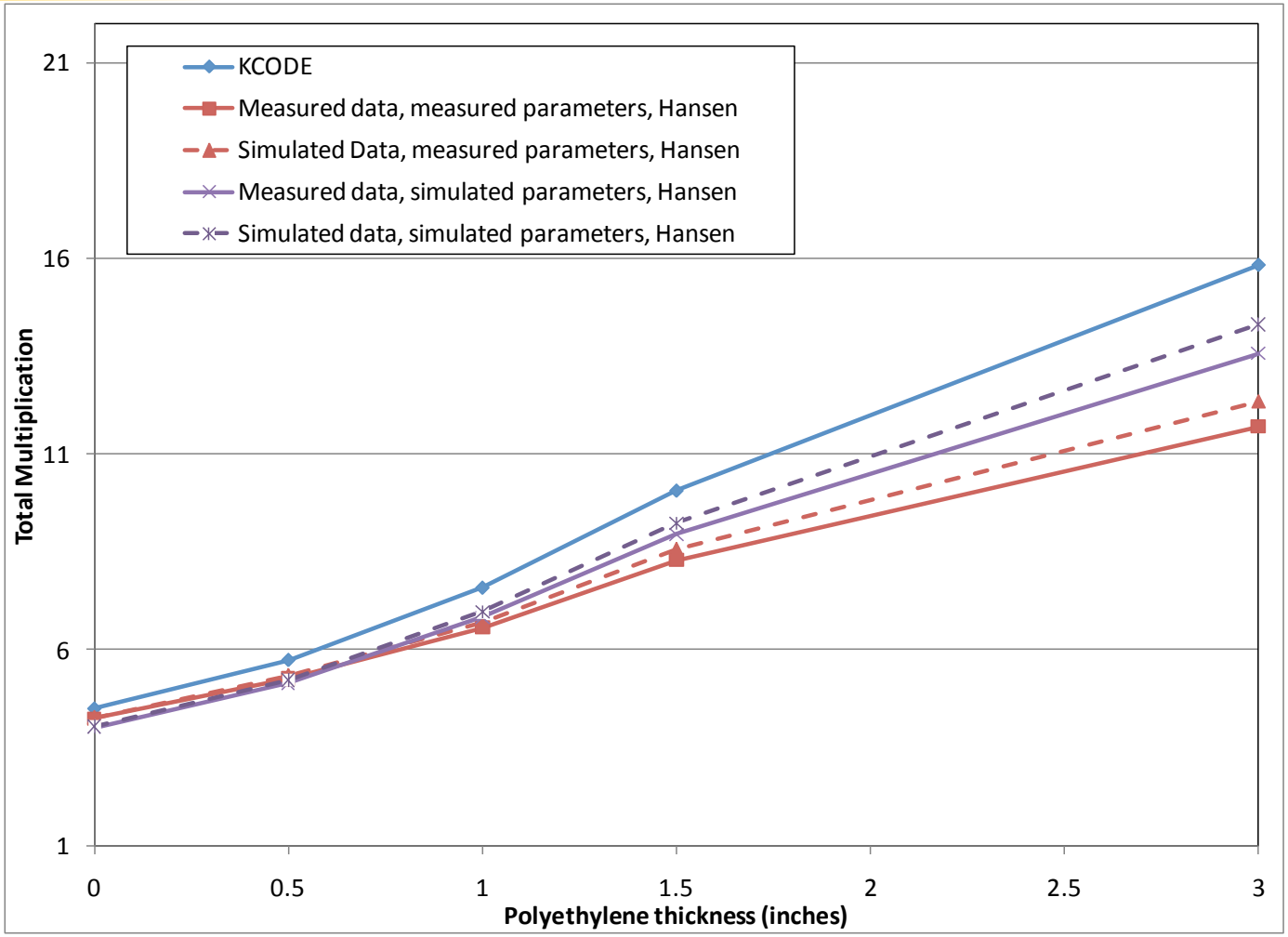
Data comparison (256 micro-sec)



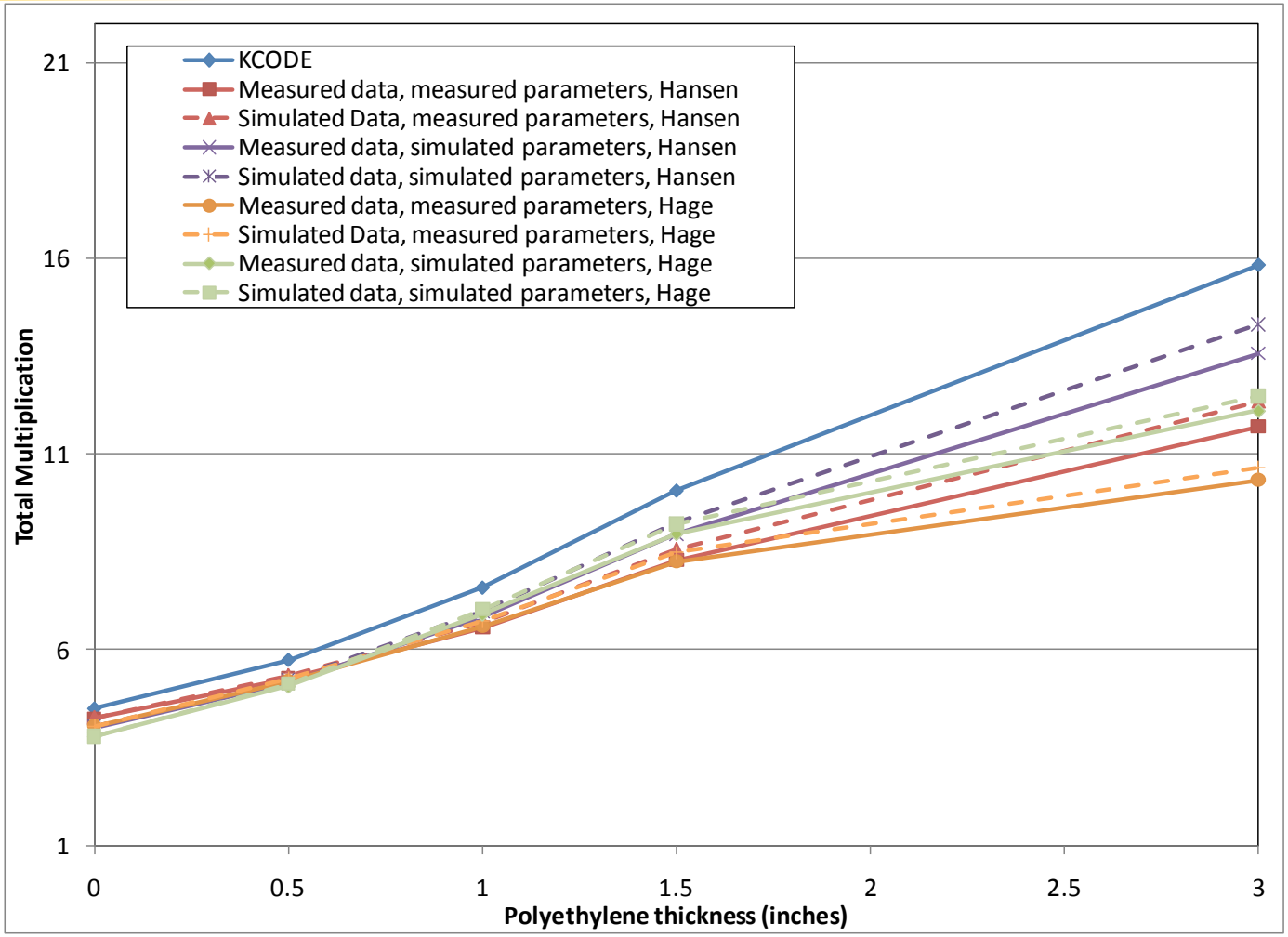
Data comparison

- Now we can compare similar data sets:
  - Measured data using measured parameters
  - Simulated data using measured parameters
  - Measured data using simulated parameters
  - Simulated data using simulated parameters
- Simulated parameters:
  - NSS (neutron source strength): F1 current tally at outermost surface.
  - Ψ (transmission): determined using F1 current tallies.

Data comparison (256 micro-sec)



Data comparison (256 micro-sec)



Data comparison (256 micro-sec)

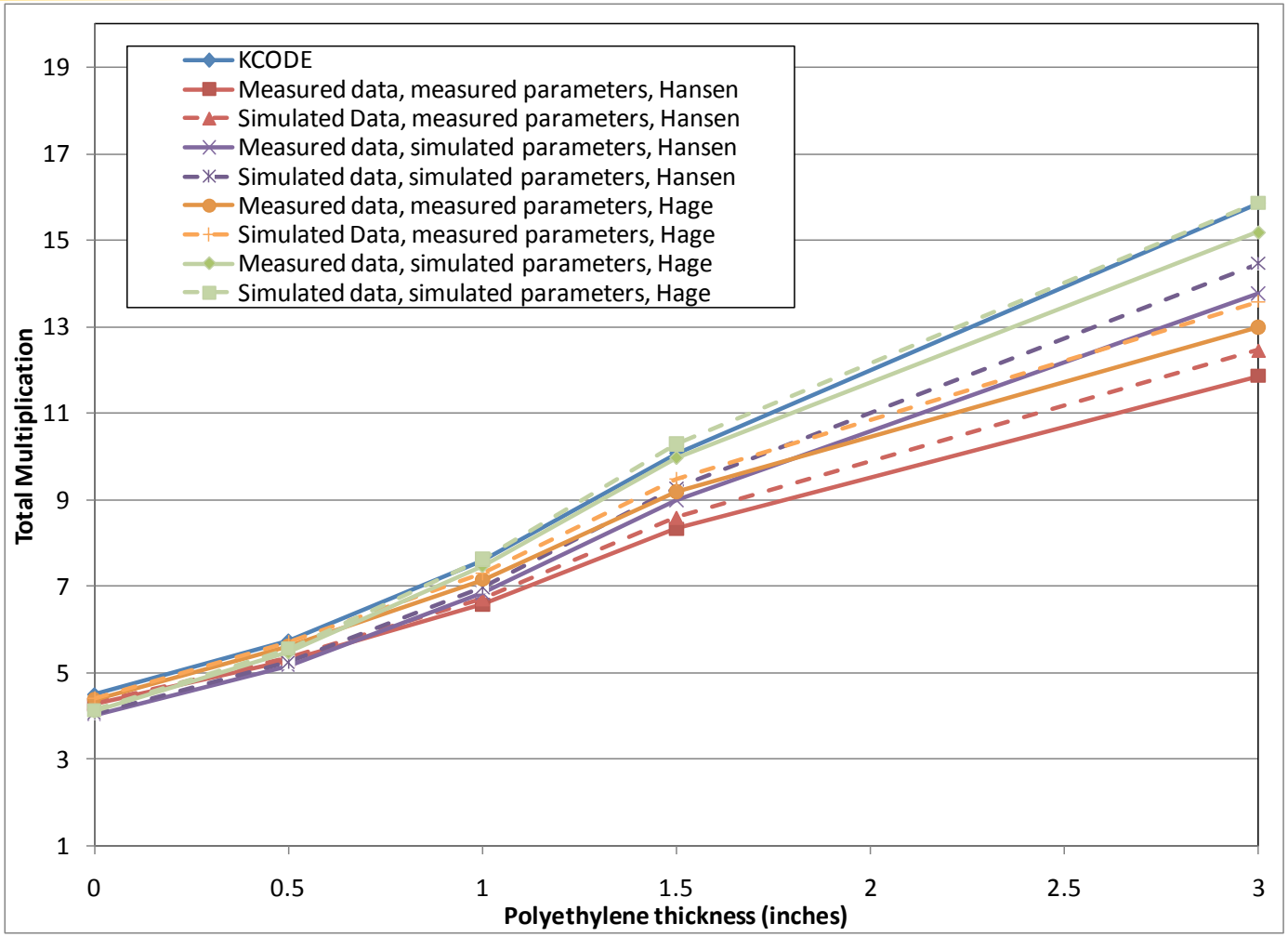
Poly	Gate Width	Method	Parameters	Measured Data	Simulated Data	C/M
0	256	Hansen-Dowdy	Measured	4.27	4.27	1.00
0.5				5.26	5.35	1.02
1				6.55	6.70	1.02
1.5				8.31	8.57	1.03
3				11.71	12.34	1.05
0			Simulated	4.04	4.03	1.00
0.5				5.14	5.22	1.02
1				6.82	6.97	1.02
1.5				8.96	9.25	1.03
3				13.58	14.32	1.05
0		Hage-Cifarelli	Measured	4.05	4.05	1.00
0.5				5.20	5.27	1.01
1				6.61	6.73	1.02
1.5				8.26	8.49	1.03
3				10.35	10.66	1.03
0			Simulated	3.78	3.78	1.00
0.5				5.07	5.13	1.01
1				6.91	7.03	1.02
1.5				8.97	9.22	1.03
3				12.12	12.48	1.03

Conclusions/future work

- Establish a consistent method for determining parameters (both measured and/or simulated).
- Agree upon a single method (and possibly gate width or means to calculate a preferred gate width) that will be used for all future measurements.
- Perform additional comparisons with existing measured data.

Extra Slides

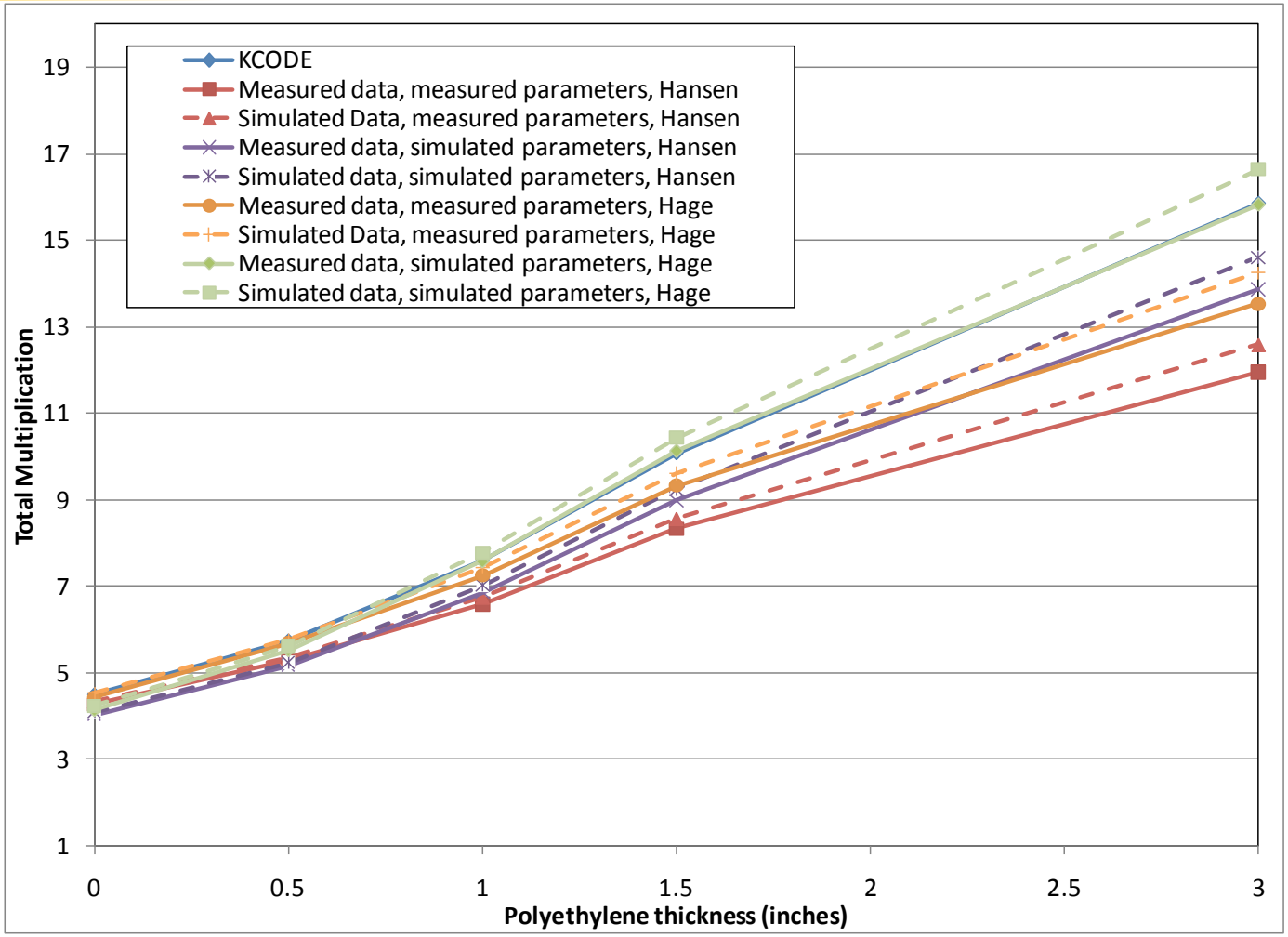
Data comparison (1024 micro-sec)



Data comparison (1024 micro-sec)

Poly	Gate Width	Method	Parameters	Measured Data	Simulated Data	C/M
0	1024	Hansen-Dowdy	Measured	4.29	4.29	1.00
0.5				5.28	5.36	1.02
1				6.57	6.70	1.02
1.5				8.34	8.59	1.03
3				11.86	12.46	1.05
0			Simulated	4.05	4.05	1.00
0.5				5.16	5.23	1.02
1				6.84	6.97	1.02
1.5				8.99	9.26	1.03
3				13.76	14.45	1.05
0		Hage-Cifarelli	Measured	4.38	4.41	1.01
0.5				5.61	5.70	1.02
1				7.14	7.29	1.02
1.5				9.18	9.48	1.03
3				12.99	13.58	1.05
0			Simulated	4.10	4.13	1.01
0.5				5.46	5.55	1.02
1				7.46	7.62	1.02
1.5				9.97	10.29	1.03
3				15.18	15.87	1.05

Data comparison (2048 micro-sec)



Data comparison (2048 micro-sec)

Poly	Gate Width	Method	Parameters	Measured Data	Simulated Data	C/M
0	2048	Hansen-Dowdy	Measured	4.29	4.33	1.01
0.5				5.25	5.35	1.02
1				6.57	6.74	1.03
1.5				8.34	8.56	1.03
3				11.95	12.59	1.05
0			Simulated	4.05	4.09	1.01
0.5				5.13	5.23	1.02
1				6.84	7.02	1.03
1.5				9.00	9.24	1.03
3				13.86	14.60	1.05
0		Hage-Cifarelli	Measured	4.43	4.52	1.02
0.5				5.67	5.76	1.01
1				7.24	7.43	1.03
1.5				9.33	9.61	1.03
3				13.53	14.24	1.05
0			Simulated	4.14	4.23	1.02
0.5				5.52	5.60	1.01
1				7.57	7.77	1.03
1.5				10.12	10.42	1.03
3				15.81	16.64	1.05