

# BCQM Stage-3 Robustness Panel

## Knee band and clock metastability across conditions (v0.2)

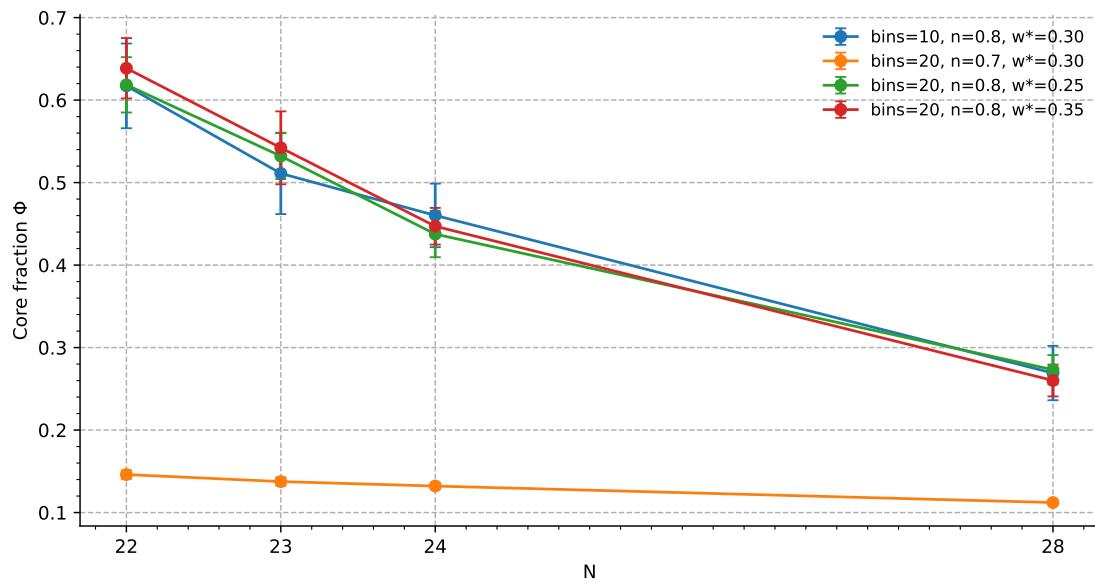
Peter M. Ferguson  
*Independent Researcher*

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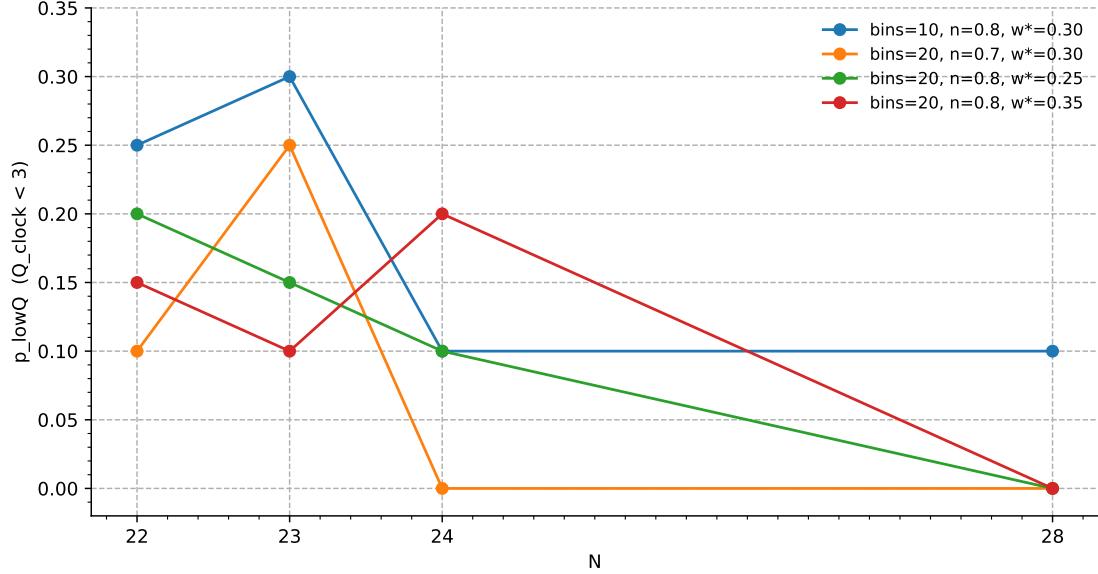
### Scope

This one-page panel summarises robustness checks over the knee band  $N \in \{22, 23, 24, 28\}$  under four conditions: (i) bins=10 at  $n = 0.8, w^{=0.30}$ ; (ii)  $n = 0.7$  at bins=20,  $w^{=0.30}$ ; (iii)  $w^{=0.25}$  at bins=20,  $n = 0.8$ ; (iv)  $w^{=0.35}$  at bins=20,  $n = 0.8$ . Each point uses 20 seeds per  $N$ .

Robustness panel: core fraction  $\Phi$  across conditions



Robustness panel: low-Q probability across conditions



Condition		$N$	$\Phi$	$p_{\text{lowQ}}$	$Q_{\text{high}}$	$d_{L2}$ mean	$d_{L2}$ p90
bins=10, n=0.8, w*=0.30	22	$0.617 \pm 0.051$	0.25	$5.157 \pm 0.104$	$0.0018 \pm 0.0011$	0.0035	
bins=10, n=0.8, w*=0.30	23	$0.511 \pm 0.049$	0.30	$5.296 \pm 0.112$	$0.0015 \pm 0.0009$	0.0029	
bins=10, n=0.8, w*=0.30	24	$0.460 \pm 0.039$	0.10	$5.372 \pm 0.127$	$0.0019 \pm 0.0013$	0.0041	
bins=10, n=0.8, w*=0.30	28	$0.269 \pm 0.033$	0.10	$5.739 \pm 0.104$	$0.0011 \pm 0.0007$	0.0021	
bins=20, n=0.7, w*=0.30	22	$0.146 \pm 0.005$	0.10	$5.159 \pm 0.138$	$0.0010 \pm 0.0007$	0.0020	
bins=20, n=0.7, w*=0.30	23	$0.138 \pm 0.005$	0.25	$5.327 \pm 0.123$	$0.0006 \pm 0.0004$	0.0011	
bins=20, n=0.7, w*=0.30	24	$0.132 \pm 0.004$	0.00	$5.379 \pm 0.104$	$0.0006 \pm 0.0003$	0.0010	
bins=20, n=0.7, w*=0.30	28	$0.112 \pm 0.000$	0.00	$5.779 \pm 0.140$	$0.0005 \pm 0.0003$	0.0009	
bins=20, n=0.8, w*=0.25	22	$0.619 \pm 0.034$	0.20	$5.027 \pm 0.348$	$0.0009 \pm 0.0005$	0.0016	
bins=20, n=0.8, w*=0.25	23	$0.532 \pm 0.028$	0.15	$5.273 \pm 0.122$	$0.0013 \pm 0.0008$	0.0026	
bins=20, n=0.8, w*=0.25	24	$0.438 \pm 0.028$	0.10	$5.358 \pm 0.115$	$0.0010 \pm 0.0006$	0.0018	
bins=20, n=0.8, w*=0.25	28	$0.273 \pm 0.018$	0.00	$5.799 \pm 0.126$	$0.0010 \pm 0.0006$	0.0019	
bins=20, n=0.8, w*=0.35	22	$0.639 \pm 0.037$	0.15	$5.145 \pm 0.164$	$0.0009 \pm 0.0006$	0.0016	
bins=20, n=0.8, w*=0.35	23	$0.542 \pm 0.044$	0.10	$5.209 \pm 0.112$	$0.0013 \pm 0.0008$	0.0024	
bins=20, n=0.8, w*=0.35	24	$0.447 \pm 0.022$	0.20	$5.364 \pm 0.136$	$0.0011 \pm 0.0007$	0.0023	
bins=20, n=0.8, w*=0.35	28	$0.260 \pm 0.019$	0.00	$5.789 \pm 0.097$	$0.0012 \pm 0.0015$	0.0026	

Table 1: Robustness summary for the knee band ( $N=22,23,24,28$ ).  $p_{\text{lowQ}}$  uses the threshold  $Q_{\text{clock}} < 3$ .  $Q_{\text{high}}$  is computed over runs with  $Q_{\text{clock}} \geq 3$ . Ball-growth stability uses within-N pairwise  $d_{L2}$  distances (20 seeds 190 pairs).