

Dependence on the size of the subset of QPUs

Here we report the results of different split and merge strategies for a fixed set of circuits and to different subsets of QPUs as a function of the subset size. In Section 1 we report plots at fixed pair of split-merge policies, while in Section 2 we report results at fixed type of circuit.

1 Fixed policies

The pairs of policies considered are reported in Table 1, with links to the corresponding plots.

2 Fixed circuits

The types of circuits considered are reported in Table 1, with links to the corresponding plots. The specific benchmark circuits have been generated as qasm code for 5 and 8 qubits using the MQT Bench library.

		merge		
		fair	Hell.	MISE
split	fair	Fig. 1	Fig. 2	Fig. 3
	Hell.	Fig. 5	Fig. 5	Fig. 6
	MISE	Fig. 7	Fig. 8	Fig. 9

Table 1: Table of redirection for comparisons between single QPU executions and the ones obtained with subsets of QPUs for different pairs of policies.

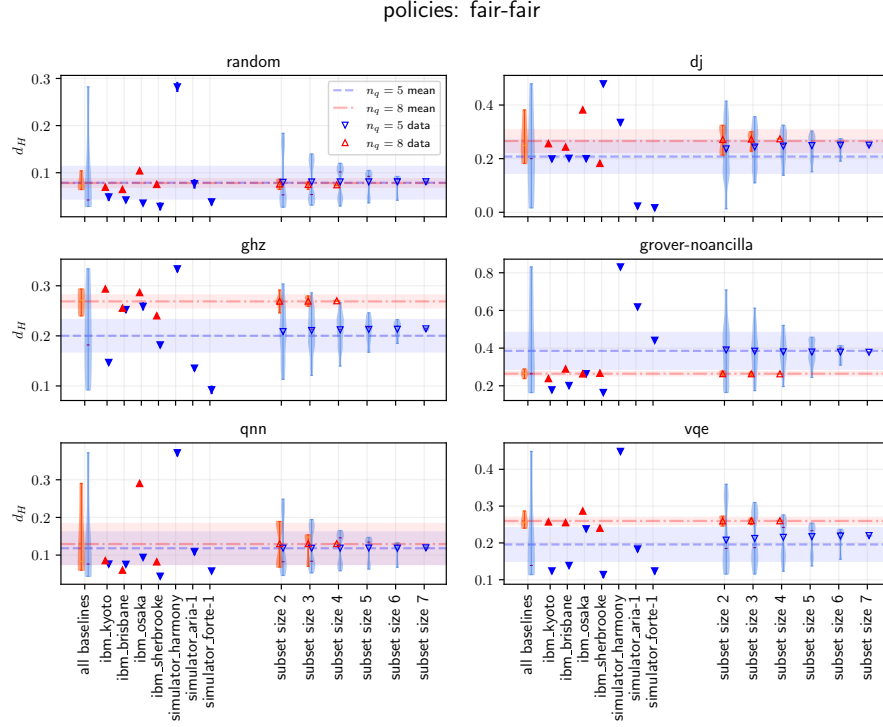


Figure 1: Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘fair-split’ and a ‘fair-merge’ policy.

circuit class					
random	dj	ghz	grover-noancilla	qnn	vqe
Fig. 10	Fig. 11	Fig. 12	Fig. 13	Fig. 14	Fig. 15

Table 2: Table of redirection for comparisons between single QPU executions and the ones obtained with subsets of QPUs for different types of benchmark circuits.

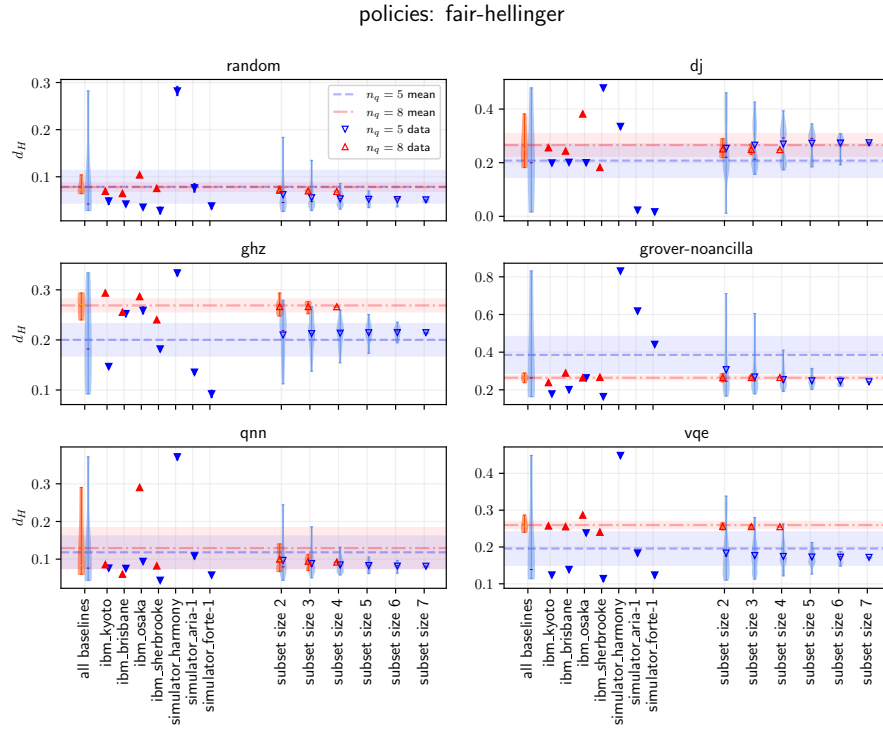


Figure 2: *Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘fair-split’ and a ‘Hellinger-merge’ policy.*

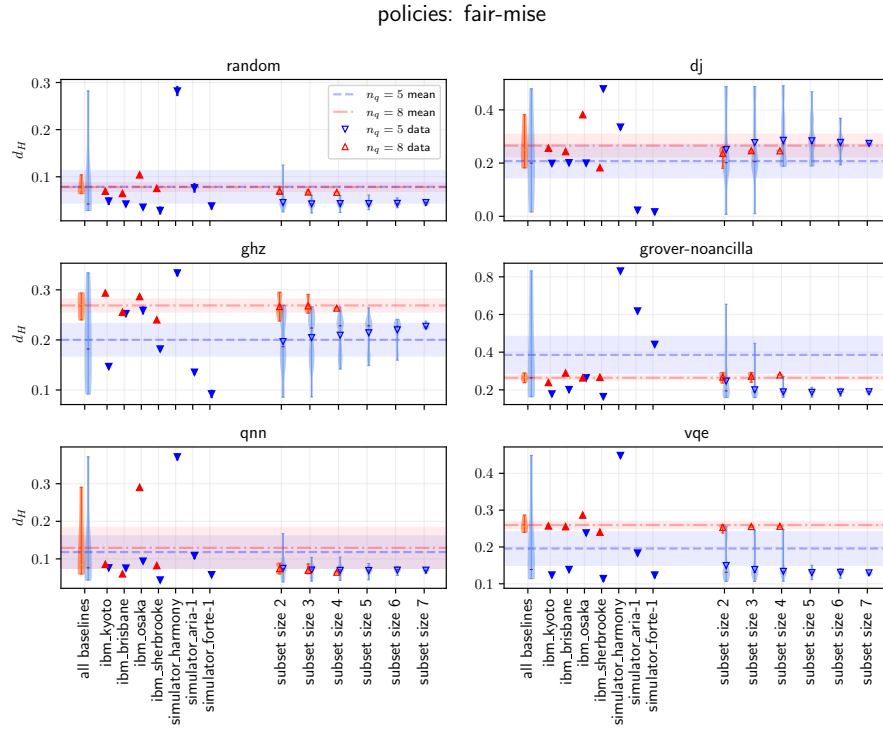


Figure 3: *Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘fair-split’ and a ‘MISE-merge’ policy.*

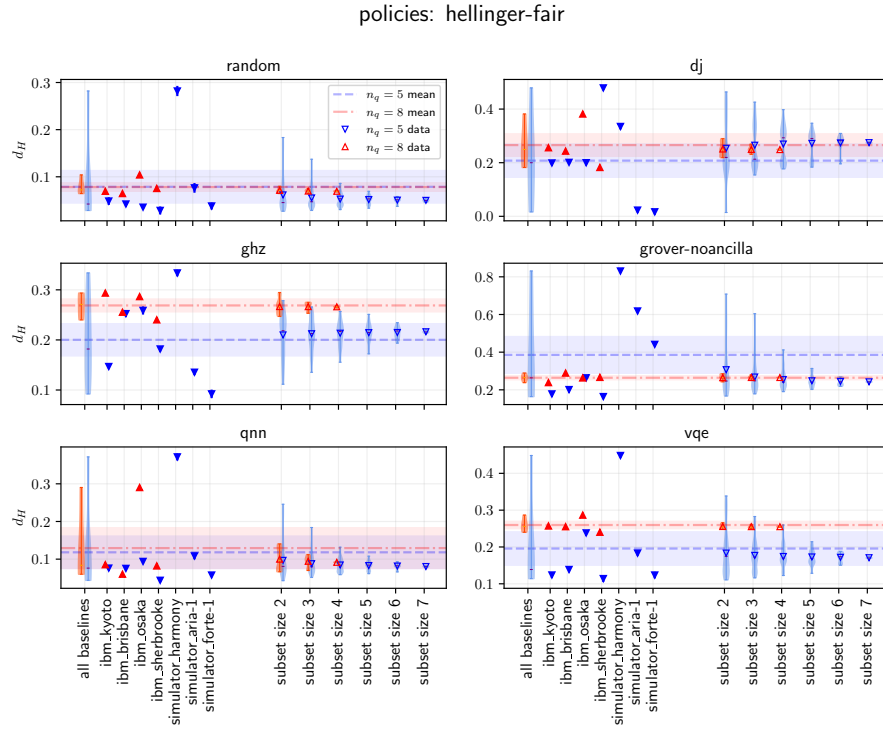


Figure 4: *Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘Hellinger-split’ and a ‘fair-merge’ policy.*

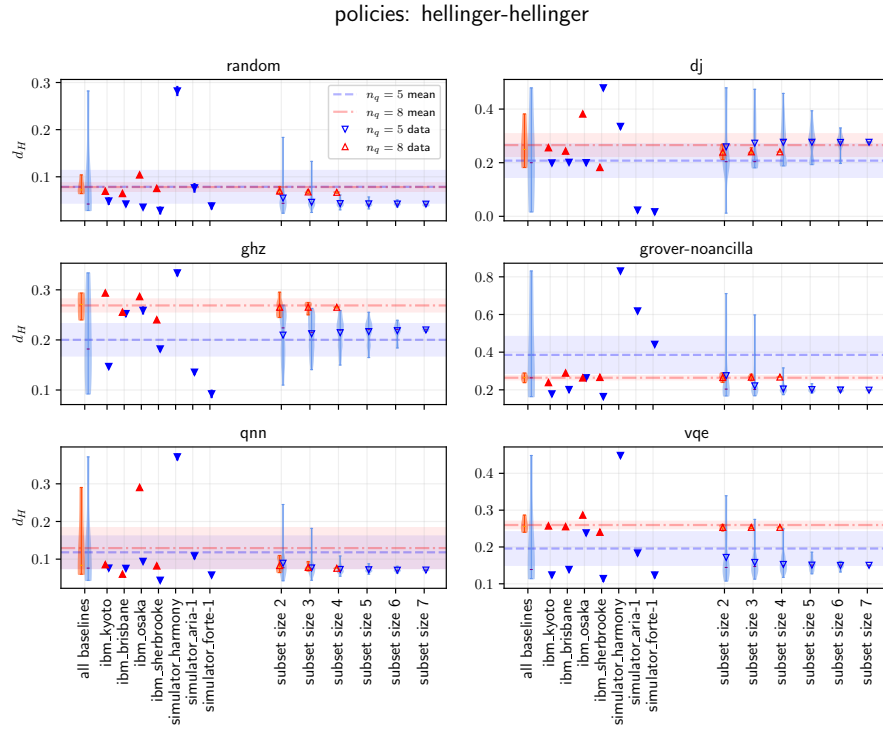


Figure 5: *Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘Hellinger-split’ and a ‘Hellinger-merge’ policy.*

policies: hellinger-mise

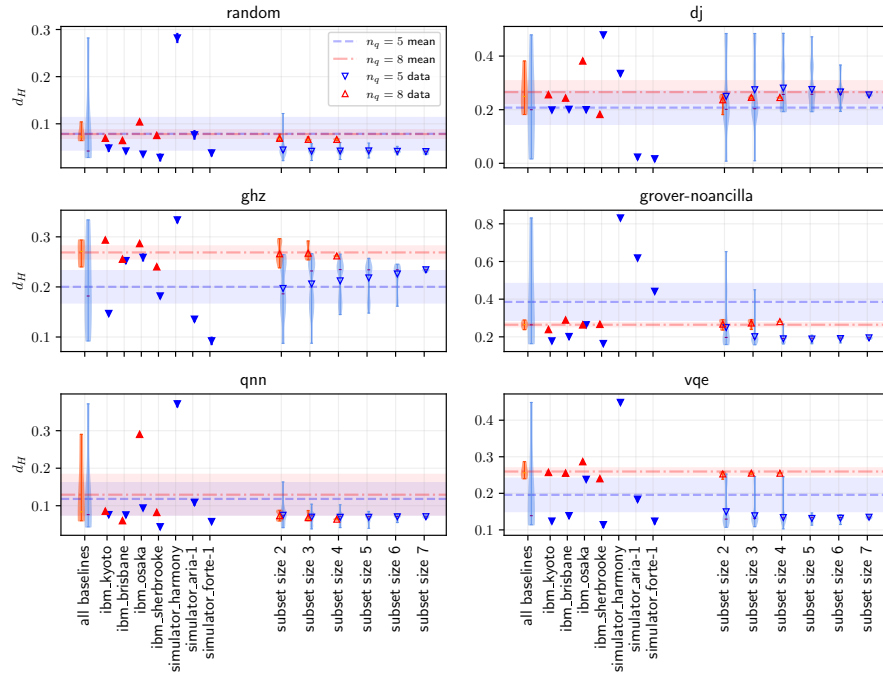


Figure 6: Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘Hellinger-split’ and a ‘MISE-merge’ policy.

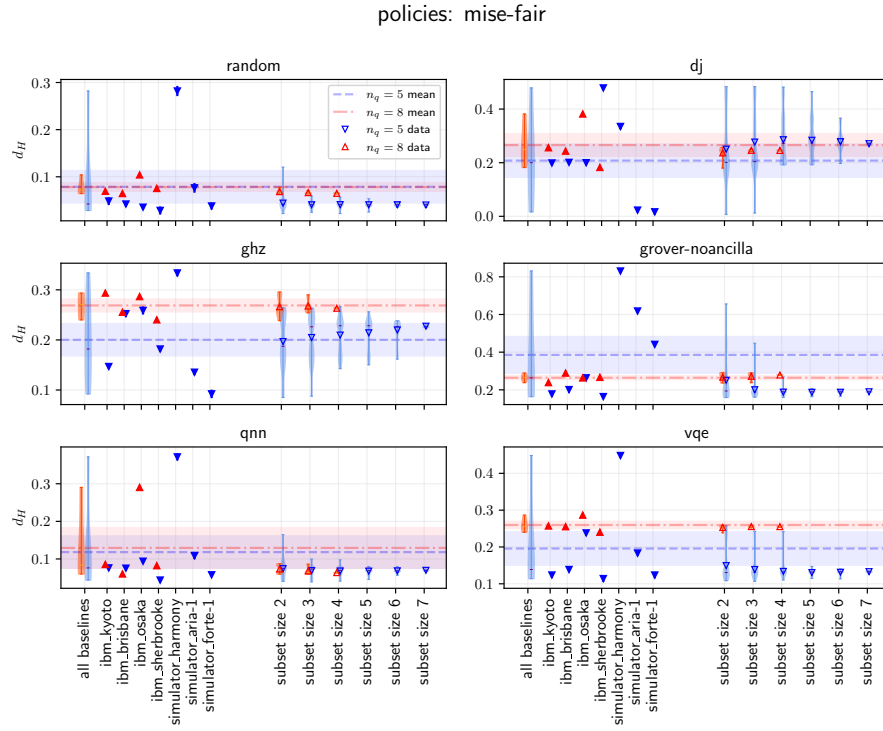


Figure 7: Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘MISE-split’ and a ‘fair-merge’ policy.

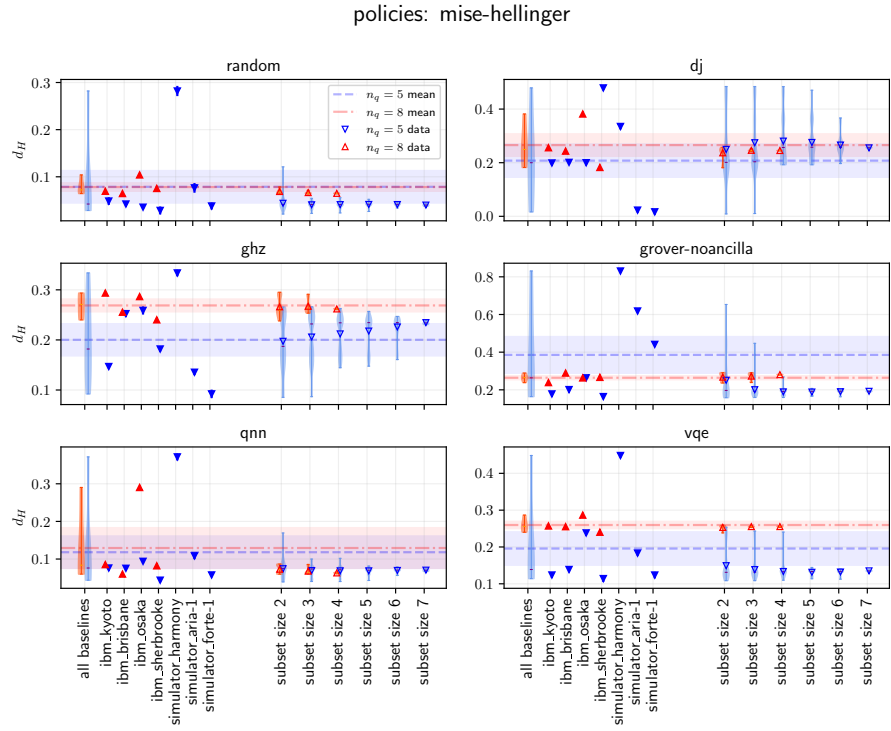


Figure 8: *Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘MISE-split’ and a ‘Hellinger-merge’ policy.*

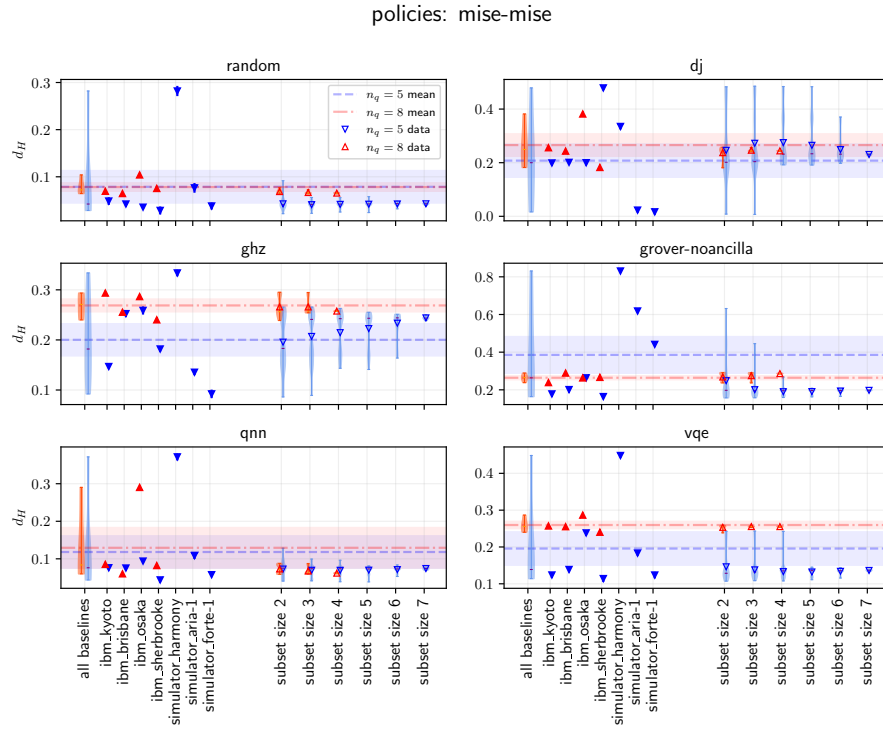


Figure 9: Hellinger distances between exact results and subsets of QPUs with increasing size using a ‘MISE-split’ and a ‘MISE-merge’ policy.

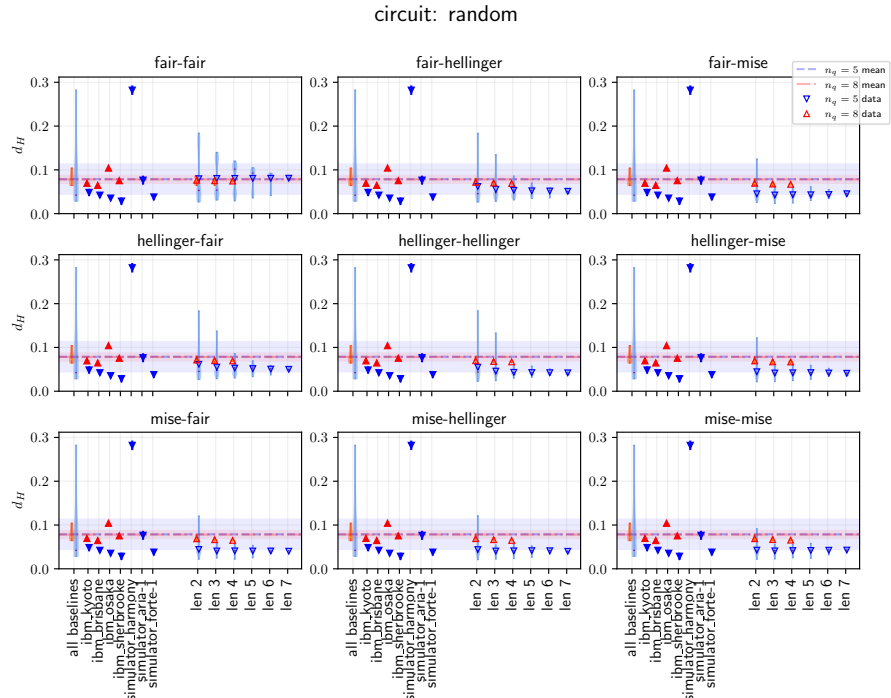
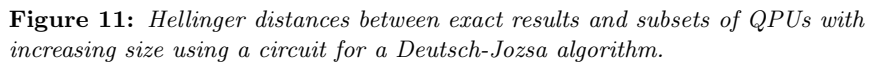


Figure 10: Hellinger distances between exact results and subsets of QPUs with increasing size using a random (Haar uniform) circuit.



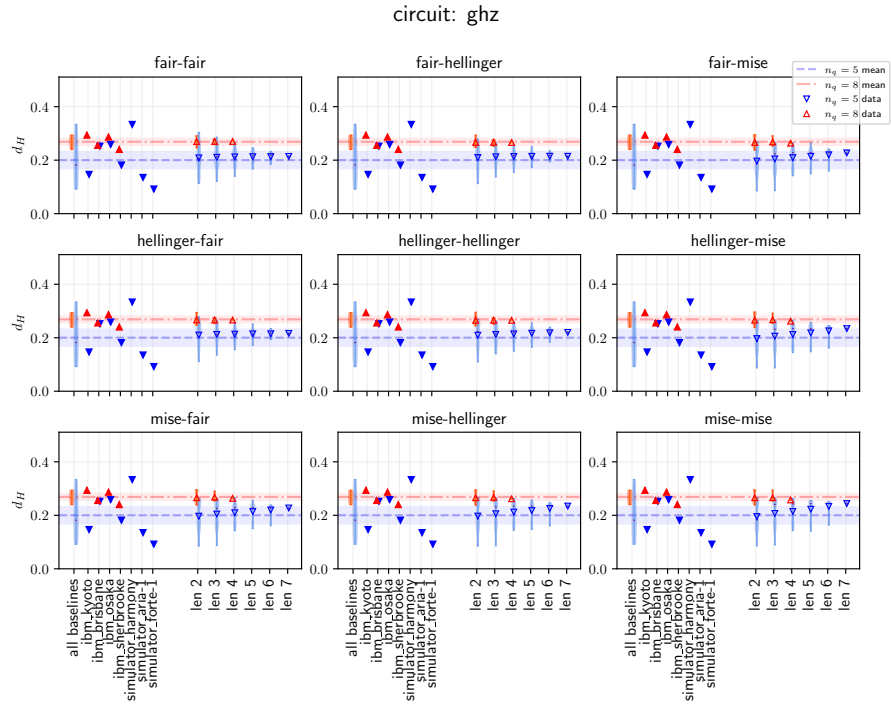


Figure 12: Hellinger distances between exact results and subsets of QPUs with increasing size using a circuit preparing the GHZ state.

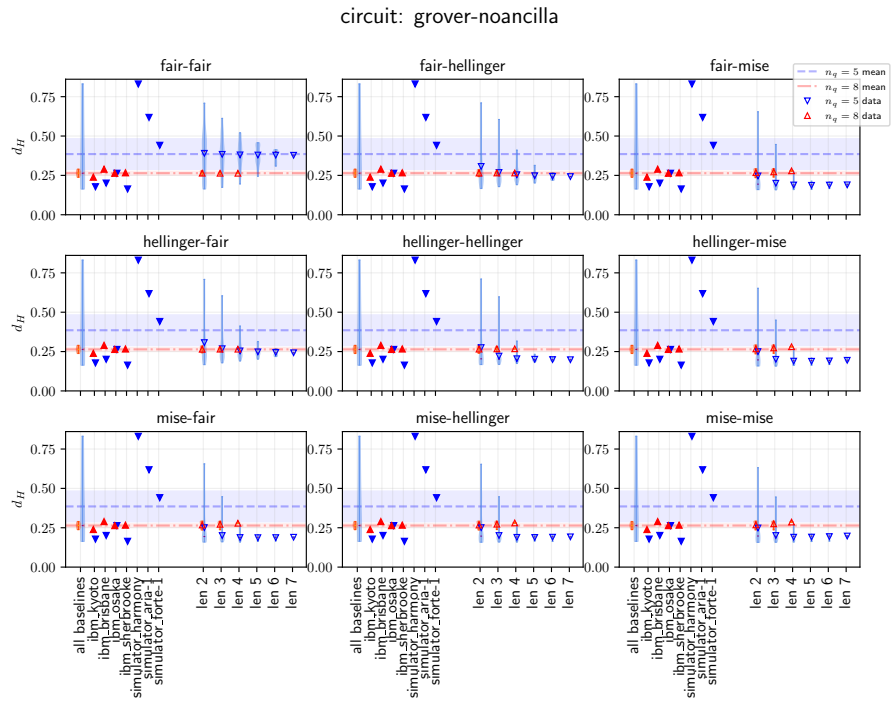


Figure 13: Hellinger distances between exact results and subsets of QPUs with increasing size using a circuit for a Grover search (without ancilla).

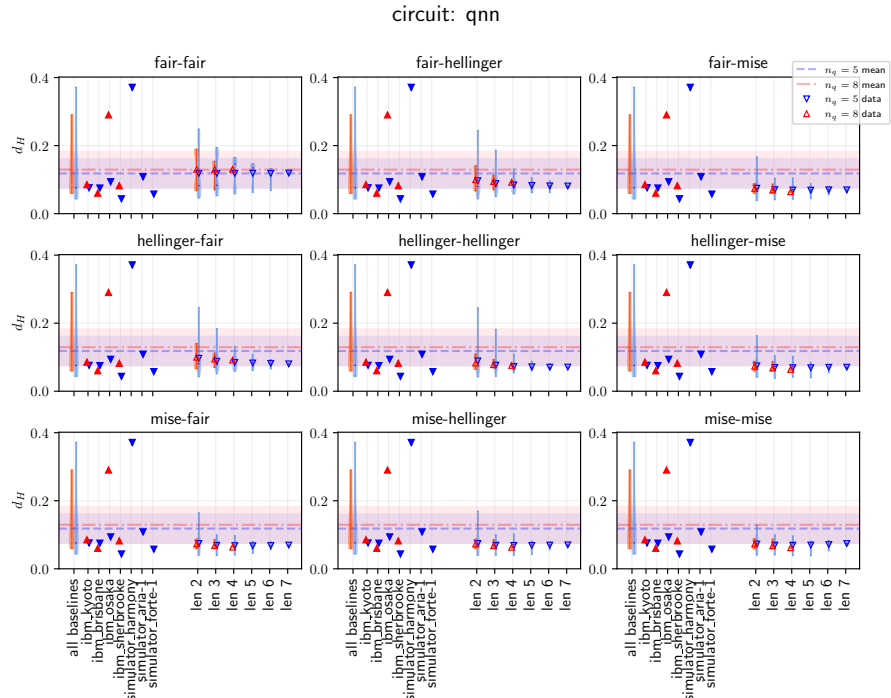


Figure 14: Hellinger distances between exact results and subsets of QPUs with increasing size using a generic Quantum Neural Network circuit.

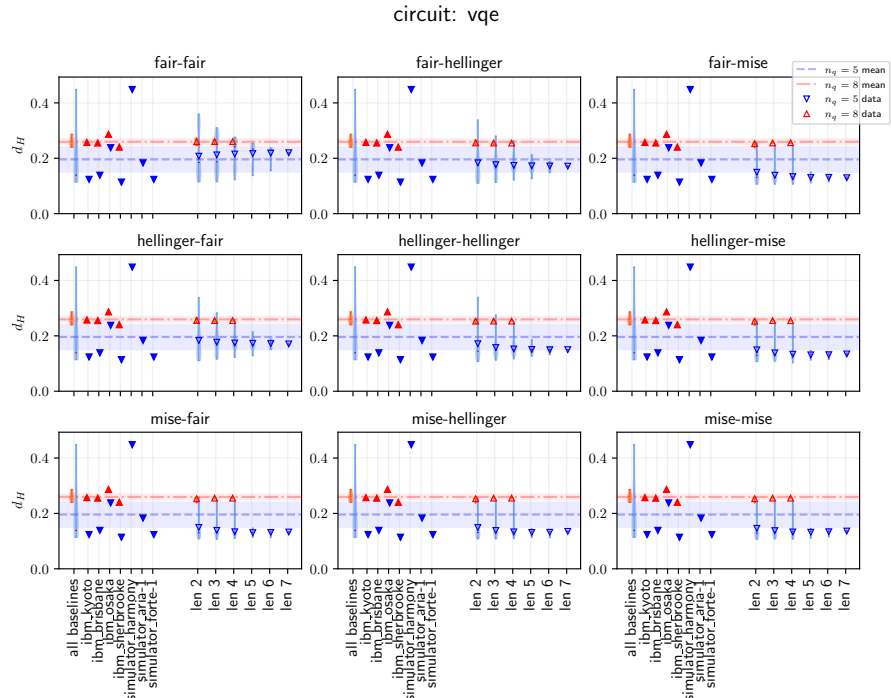


Figure 15: Hellinger distances between exact results and subsets of QPUs with increasing size using a Variational Quantum Eigensolver (VQE) circuit.