•	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
full.20.1         dj         36         11         0         0         nan         nan         11         11         11         0           full.20.1         graphstate         50         22         0         0         nan         nan         22         20         0         0         nan         nan         42         42         42         42         42         42         42<	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
full_20.1         graphstate offile         50         22         0         0         0         nan         nan         22         22         22         0           full_20.1         qft         71         38         0         0         0         nan         nan         38         <	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
full_20.1         qft         71         38         0         0         0         nan         nan         38         38         38         38         0           full_20.1         wstate         73         45         0         0         0         nan         nan         45         45         0           full_20.1         vqe         83         21         0         0         nan         nan         42         42         20           full_20.1         qaoa         95         31         0         0         0         nan         nan         31         31         31         0           full_20.1         realamprandom         130         37         0         0         0         nan         nan         37         37         0           full_20.1         twolocalrandom         130         37         0         0         nan         nan         37         37         0           full_20.1         portfolioqua         150         41         0         0         0         nan         nan         77         72         72         0         0         0         nan         nan         77         77	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
full_20.1         wstate         73         45         0         0         0         nan         nan         45         45         40         0         0         nan         nan         45         45         40         0         0         nan         nan         42         42         20         0         0         nan         nan         42         42         20         0         0         nan         nan         42         42         20         0         0         nan         nan         21	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
full_20.1         qftentangled         78         42         0         0         0         nan         nan         42         42         42         0           full_20.1         vqe         83         21         0         0         0         nan         nan         21         22         22         22         22         22         22         22         22         22         22         22         22         22         22	0 0 0 0 0 0 0 0 0 0 0 35.29 0 0 0 0 0 0 0 49.38
full_20_1         vqe         83         21         0         0         0         nan         nan         21         21         21         0           full_20_1         qaoa         95         31         0         0         0         nan         nan         31         31         31         0           full_20_1         twolocalrandom         130         37         0         0         0         nan         nan         37         37         37           full_20_1         twolocalrandom         150         41         0         0         0         nan         nan         41	0 0 0 0 0 0 0 0 0 0 35.29 0 0 0 0 0 0 0 49.38
full_20_1         qaoa         95         31         0         0         0         nan         nan         31         31         31         0           full_20_1         realamprandom         130         37         0         0         0         nan         nan         37         30         0         0         0         0         0         0         0         0         0         10         10         10         10         10         10         10	0 0 0 0 0 0 0 0 35.29 0 0 0 0 0 0 0 49.38
full_20_1         realamprandom         130         37         0         0         0         nan         nan         37         37         37         0           full_20_1         twolocalrandom         130         37         0         0         0         nan         nan         37         30         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0         0 <td>0 0 0 0 0 0 0 35.29 0 0 0 0 0 0 49.38</td>	0 0 0 0 0 0 0 35.29 0 0 0 0 0 0 49.38
full_20_1         su2random         150         41         0         0         0         nan         nan         41         41         41         0           full_20_1         qnn         154         58         0         0         0         nan         nan         58<	0 0 0 0 0 0 35.29 0 0 0 0 0 0 0 49.38
full_20_1         qnn         154         58         0         0         0         nan         nan         58         58         58         58         0           full_20_1         portfolioqaoa         195         72         0         0         0         nan         nan         72         72         72         0           full_20_1         portfolioqe         310         107         0         0         0         nan         nan         97         97         97         0           full_10_2         ghz         7         7         0         0         0         nan         nan         7         7         0         0           full_10_2         dj         36         11         0         3         0         nan         nan         22         22         22         0           full_10_2         graphstate         50         22         0         0         nan         nan         22         22         20         0         11         17         11         0           full_10_2         qft         71         38         0         0         nan         nan         12         24         24	0 0 0 0 0 35.29 0 0 0 0 0 0 0 49.38
full_20.1         portfolioqaoa         195         72         0         0         0         nan         nan         72         72         72         0           full_20.1         random         223         97         0         0         0         nan         nan         97         97         97         0           full_10.2         ghz         7         7         0         0         0         nan         nan         107         107         107         0           full_10.2         ghz         7         7         0         0         0         nan         nan         7         7         7         0         0         nan         nan         100         11         17         11         0         11         17         11         0         0         0         nan         nan         100         11         17         11         0         0         0         nan         nan         100         11         17         11         0         0         0         nan         nan         10         11         11         11         10         0         0         nan         nan         12         22	0 0 0 0 35.29 0 0 0 0 0 0 49.38
full_20_1         random         223         97         0         0         nan         nan         97         97         97         0           full_20_1         portfoliovqe         310         107         0         0         0         nan         nan         107         107         107         0           full_10_2         ghz         7         7         0         0         0         nan         nan         7	0 0 0 35.29 0 0 0 0 0 0 0 49.38
full_20_1         portfoliovqe         310         107         0         0         0         nan         nan         107         107         0           full_10_2         ghz         7         7         7         0         0         0         nan         nan         7         7         7         0           full_10_2         dj         36         11         0         3         0         nan         100         11         17         11         0           full_10_2         graphstate         50         22         0         0         0         nan         nan         22         22         22         22         22         22         22         22         20         0         0         nan         nan         38         38         38         0         full_10_2         qft         7         3         45         0         0         nan         nan         45         45         0         0         nan         nan         42         42         0         0         nan         nan         41         42         42         0         0         nan         nan         31         31         31         31<	0 0 35.29 0 0 0 0 0 0 0 49.38
full_10_2         ghz         7         7         0         0         0         nan         nan         7         7         7         0           full_10_2         dj         36         11         0         3         0         nan         100         11         17         11         0           full_10_2         graphstate         50         22         0         0         0         nan         nan         22         22         22         22         20         0           full_10_2         qft         71         38         0         0         0         nan         nan         38         38         38         0           full_10_2         qftentangled         78         42         0         0         nan         nan         45         45         45         0           full_10_2         qftentangled         78         42         0         0         0         nan         nan         42         42         0         0         nan         nan         42         42         0           full_10_2         qaoa         95         31         0         0         0         nan         nan <td>0 35.29 0 0 0 0 0 0 0 0 49.38</td>	0 35.29 0 0 0 0 0 0 0 0 49.38
full_10_2         dj         36         11         0         3         0         nan         100         11         17         11         0           full_10_2         graphstate         50         22         0         0         0         nan         nan         22         22         22         0           full_10_2         qft         71         38         0         0         0         nan         nan         38	35.29 0 0 0 0 0 0 0 0 0 49.38
full_10_2         graphstate         50         22         0         0         nan         nan         22         22         22         0           full_10_2         qft         71         38         0         0         0         nan         nan         38         38         38         0           full_10_2         wstate         73         45         0         0         0         nan         nan         45         45         0           full_10_2         qftentangled         78         42         0         0         0         nan         nan         42         42         42         0           full_10_2         vqe         83         21         0         0         0         nan         nan         21         21         21         21         21         21         21         21         21         0         0         0         nan         nan         21         21         21         21         0         0         0         nan         nan         21         21         21         0         0         0         nan         nan         31         31         31         0         0         0	0 0 0 0 0 0 0 0 0 49.38
full_10_2         qft         71         38         0         0         0         nan         nan         38         38         38         38         0         0         0         nan         nan         45         45         45         0           full_10_2         qftentangled         78         42         0         0         0         nan         nan         42         42         42         0           full_10_2         vqe         83         21         0         0         0         nan         nan         21         0         0         nan         nan         31         31         31         30         37         0         0         0         nan         nan         30         37 <td< td=""><td>0 0 0 0 0 0 0 0 49.38</td></td<>	0 0 0 0 0 0 0 0 49.38
full_10_2         wstate         73         45         0         0         nan         nan         45         45         45         0           full_10_2         qftentangled         78         42         0         0         0         nan         nan         42         42         42         0           full_10_2         vqe         83         21         0         0         0         nan         nan         21         21         21         21         0           full_10_2         qaoa         95         31         0         0         0         nan         nan         37         0         0         0	0 0 0 0 0 0 49.38
full_10_2         qftentangled         78         42         0         0         nan         nan         42         42         42         0           full_10_2         vqe         83         21         0         0         0         nan         nan         21         21         21         0           full_10_2         qaoa         95         31         0         0         0         nan         nan         31         31         31         0           full_10_2         realamprandom         130         37         0         0         0         nan         nan         37         37         37         37         0           full_10_2         twolocalrandom         130         37         0         0         0         nan         nan         37         38         38         11         0<	0 0 0 0 0 49.38
full_10_2         vqe         83         21         0         0         nan         nan         21         21         21         0           full_10_2         qaoa         95         31         0         0         0         nan         nan         31         31         31         0           full_10_2         realamprandom         130         37         0         0         0         nan         nan         37         37         37         0           full_10_2         twolocalrandom         130         37         0         0         0         nan         nan         37         37         37         0           full_10_2         su2random         150         41         0         15         0         nan         100         41         81         41         0           full_10_2         qnn         154         58         0         0         nan         nan         58         58         58         0           full_10_2         portfolioqaoa         195         72         0         0         nan         nan         72         72         72         0           full_10_2         portfolioqaoa<	0 0 0 0 49.38
full_10_2         qaoa         95         31         0         0         nan         nan         31         31         31         0           full_10_2         realamprandom         130         37         0         0         0         nan         nan         37         37         37         0           full_10_2         twolocalrandom         130         37         0         0         0         nan         nan         37         37         37         0           full_10_2         su2random         150         41         0         15         0         nan         100         41         81         41         0           full_10_2         qnn         154         58         0         0         0         nan         nan         58         58         58         0           full_10_2         portfolioqaoa         195         72         0         0         0         nan         nan         72         72         72         0           full_10_2         portfoliovae         310         107         0         0         nan         nan         107         107         107         0           full_10_	$0 \\ 0 \\ 0 \\ 49.38$
full_10_2         realamprandom         130         37         0         0         0         nan         nan         37         37         37         0           full_10_2         twolocalrandom         130         37         0         0         0         nan         nan         37         37         37         0           full_10_2         su2random         150         41         0         15         0         nan         100         41         81         41         0           full_10_2         qnn         154         58         0         0         0         nan         nan         58	$0 \\ 0 \\ 49.38$
full_10_2         twolocalrandom         130         37         0         0         0         nan         nan         37         37         37         0           full_10_2         su2random         150         41         0         15         0         nan         100         41         81         41         0           full_10_2         qnn         154         58         0         0         0         nan         nan         58 <td><math>0 \\ 49.38</math></td>	$0 \\ 49.38$
full_10_2         su2random         150         41         0         15         0         nan         100         41         81         41         0           full_10_2         qnn         154         58         0         0         0         nan         nan         58         58         58         0           full_10_2         portfolioqaoa         195         72         0         0         0         nan         nan         72         72         72         0           full_10_2         random         223         97         0         6         0         nan         100         97         141         97         0           full_10_2         portfolioqaoa         195         72         0         0         0         nan         100         97         141         97         0           full_10_2         portfolioqaoa         310         107         0         0         0         nan         100         97         141         97         0           grid_9_2         ghz         7         7         6         0         6         0         nan         13         7         8         33      <	49.38
full_10_2         qnn         154         58         0         0         0 nan         nan         58         58         58         0           full_10_2         portfolioqaoa         195         72         0         0         0 nan         nan         72         73         73         73         73         73         73         73         73         73         73         73         73         73         73         73	
full_10_2         portfolioqaoa         195         72         0         0         0 nan         nan         72         72         72         0           full_10_2         random         223         97         0         6         0 nan         100         97         141         97         0           full_10_2         portfoliovqe         310         107         0         0         0 nan         nan         107         107         107         0           grid_9_2         ghz         7         7         6         0         6         0         nan         13         7         8         38           grid_9_2         dj         36         11         9         3         0         100         100         21         14         11         4'           grid_9_2         graphstate         50         22         15         3         6         60         -100         37         25         20         44           grid_9_2         qft         71         38         39         15         21         46.15         -40         74         59         41         4           grid_9_2         qftentangled	0
full_10_2         random         223         97         0         6         0         nan         100         97         141         97         0           full_10_2         portfoliovqe         310         107         0         0         0         nan         nan         107         107         0         0           grid_9_2         ghz         7         7         6         0         6         0         nan         13         7         8         33           grid_9_2         dj         36         11         9         3         0         100         100         21         14         11         4'           grid_9_2         graphstate         50         22         15         3         6         60         -100         37         25         20         44'           grid_9_2         qft         71         38         39         15         21         46.15         -40         74         59         41         4           grid_9_2         wstate         73         45         18         0         12         33.33         nan         54         45         41         24 <t< td=""><td></td></t<>	
full_10_2         portfoliovqe         310         107         0         0         0         nan         nan         107         107         107         0           grid_9_2         ghz         7         7         6         0         6         0         nan         13         7         8         33           grid_9_2         dj         36         11         9         3         0         100         100         21         14         11         4'           grid_9_2         graphstate         50         22         15         3         6         60         -100         37         25         20         4!           grid_9_2         qft         71         38         39         15         21         46.15         -40         74         59         41         4           grid_9_2         wstate         73         45         18         0         12         33.33         nan         54         45         41         24           grid_9_2         qftentangled         78         42         45         18         27         40         -50         87         60         45         48	0
grid_9_2         ghz         7         7         6         0         6         0         nan         13         7         8         38           grid_9_2         dj         36         11         9         3         0         100         100         21         14         11         4'           grid_9_2         graphstate         50         22         15         3         6         60         -100         37         25         20         4!           grid_9_2         qft         71         38         39         15         21         46.15         -40         74         59         41         4           grid_9_2         wstate         73         45         18         0         12         33.33         nan         54         45         41         24           grid_9_2         qftentangled         78         42         45         18         27         40         -50         87         60         45         48           grid_9_2         vqe         83         21         15         0         12         20         nan         35         21         27         25           grid	31.21
grid_9_2     dj     36     11     9     3     0     100     100     21     14     11     4'       grid_9_2     graphstate     50     22     15     3     6     60     -100     37     25     20     4'       grid_9_2     qft     71     38     39     15     21     46.15     -40     74     59     41     4'       grid_9_2     wstate     73     45     18     0     12     33.33     nan     54     45     41     2'       grid_9_2     qftentangled     78     42     45     18     27     40     -50     87     60     45     48       grid_9_2     vqe     83     21     15     0     12     20     nan     35     21     27     25       grid_9_2     qaoa     95     31     9     9     21     -133.33     -133.33     37     58     48     -2	0
grid_9_2         graphstate         50         22         15         3         6         60         -100         37         25         20         44           grid_9_2         qft         71         38         39         15         21         46.15         -40         74         59         41         44           grid_9_2         wstate         73         45         18         0         12         33.33         nan         54         45         41         24           grid_9_2         qftentangled         78         42         45         18         27         40         -50         87         60         45         48           grid_9_2         vqe         83         21         15         0         12         20         nan         35         21         27         25           grid_9_2         qaoa         95         31         9         9         21         -133.33         -133.33         37         58         48         -2	
grid_9_2     qft     71     38     39     15     21     46.15     -40     74     59     41     44       grid_9_2     wstate     73     45     18     0     12     33.33     nan     54     45     41     24       grid_9_2     qftentangled     78     42     45     18     27     40     -50     87     60     45     48       grid_9_2     vqe     83     21     15     0     12     20     nan     35     21     27     25       grid_9_2     qaoa     95     31     9     9     21     -133.33     -133.33     37     58     48     -2	
grid_9_2     wstate     73     45     18     0     12     33.33     nan     54     45     41     24       grid_9_2     qftentangled     78     42     45     18     27     40     -50     87     60     45     48       grid_9_2     vqe     83     21     15     0     12     20     nan     35     21     27     25       grid_9_2     qaoa     95     31     9     9     21     -133.33     -133.33     37     58     48     -2	
grid_9_2     qftentangled     78     42     45     18     27     40     -50     87     60     45     48       grid_9_2     vqe     83     21     15     0     12     20     nan     35     21     27     25       grid_9_2     qaoa     95     31     9     9     21     -133.33     -133.33     37     58     48     -2	
grid_9_2 vqe 83 21 15 0 12 20 nan 35 21 27 25 grid_9_2 qaoa 95 31 9 9 21 -133.33 -133.33 37 58 48 -2	
grid_9_2 qaoa 95 31 9 9 21 -133.33 -133.33 37 58 48 -2	
	).73 17.24
grid_9_2 realamprandom 130 37 96 42 42 56.25 0 145 97 66 5	.48 31.96
•	.48 34
	.84 31.37
	.36 18.45
grid_9_2 portfolioqaoa 195 72 96 39 69 28.12 -76.92 199 132 121 39	
grid_9_2 random 223 97 30 12 27 10 -125 114 117 111 2.	
<u> </u>	.89 27.92
	1.29 -14.29
ring_10_2 dj 36 11 36 3 3 91.67 0 40 17 12 70	29.41
ring_10_2 graphstate 50 22 12 6 9 25 -50 32 25 20 3'	
	.35 30
	.11 11.11
	.96 32.88
	3.1 -38.1
	.55 29.69
	.96 35.29
	.96 47.62
ring_10_2 su2random 150 41 180 48 60 66.67 -25 219 115 70 68	
	.∪4 09.10
	.16 31.15
full_7_3 ghz 7 7 0 0 0 nan nan 7 7 7 0	.16 31.15 .86 36.78

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
full_7_3	dj	36	11	0	0	0	nan	nan	11	11	11	0	0
full_7_3	graphstate	50	22	0	0	0	nan	nan	22	22	22	0	0
$full_7_3$	qft	71	38	0	12	0	nan	100	38	55	38	0	30.91
$full_7_3$	wstate	73	45	0	0	0	nan	nan	45	45	45	0	0
$full_{-}7_{-}3$	qftentangled	78	42	0	6	0	nan	100	42	63	42	0	33.33
$full_7_3$	vqe	83	21	0	0	0	nan	nan	21	21	21	0	0
full_7_3	qaoa	95	31	0	6	0	nan	100	31	47	31	0	34.04
full_7_3	realamprandom	130	37	0	42	0	nan	100	37	111	37	0	66.67
full_7_3	twolocalrandom	130	37	0	15	0	nan	100	37	74	37	0	50
full_7_3	su2random	150	41	0	48	0	nan	100	41	108	41	0	62.04
full_7_3 full_7_3	qnn	154	$\frac{58}{72}$	0	9	0	nan	100	58 72	87 72	58 72	0	33.33 0
full_7_3	portfolioqaoa random	$\frac{195}{223}$	97	0	0 $12$	$0 \\ 0$	nan	nan 100	97	$\frac{72}{126}$	97	$0 \\ 0$	$\frac{0}{23.02}$
full_7_3	portfoliovqe	310	107	0	21	0	nan nan	100	107	158	107	0	32.28
grid_8_3	ghz	7	7	6	3	3	50	0	13	100	8	38.46	20
grid_8_3	dj	36	11	18	3	3	83.33	0	22	17	12	45.45	29.41
grid_8_3	graphstate	50	22	15	9	9	40	0	34	32	21	38.24	34.38
$grid_8_3$	qft	71	38	33	12	18	45.45	-50	70	47	34	51.43	27.66
grid_8_3	wstate	73	45	15	0	3	80	nan	51	45	46	9.8	-2.22
$grid_8_3$	qftentangled	78	42	33	15	27	18.18	-80	78	78	48	38.46	38.46
$grid_8_3$	vqe	83	21	6	0	12	-100	nan	26	21	25	3.85	-19.05
$grid_8_3$	qaoa	95	31	6	3	9	-50	-200	31	42	38	-22.58	9.52
$grid_8_3$	realamprandom	130	37	75	48	45	40	6.25	143	107	60	58.04	43.93
$grid_8_3$	twolocalrandom	130	37	75	45	45	40	0	143	95	60	58.04	36.84
grid_8_3	su2random	150	41	75	42	45	40	-7.14	155	108	64	58.71	40.74
grid_8_3	qnn	154	58 70	48	30	51	-6.25	-70	122	100	78	36.07	22
grid_8_3	portfolioqaoa random	$\frac{195}{223}$	72 97	$\frac{75}{36}$	$\frac{39}{12}$	57 21	$\frac{24}{41.67}$	-46.15 -75	$\frac{187}{162}$	$\frac{145}{106}$	91 106	51.34	37.24
grid_8_3 grid_8_3	portfoliovqe	310	107	30 75	39	48	41.07 36	-73 -23.08	$102 \\ 192$	164	$100 \\ 117$	$34.57 \\ 39.06$	$0 \\ 28.66$
$ring_7_3$	ghz	7	7	0	3	9	nan	-200	$\frac{192}{7}$	104	8	-14.29	20.00
$ring_{-7}$ -3	dj	36	11	$\frac{0}{24}$	3	$\frac{3}{3}$	87.5	0	30	16	12	60	$\frac{25}{25}$
$ring_{-7}$ 3	graphstate	50	22	6	6	9	-50	-50	$\frac{3}{24}$	28	20	16.67	28.57
$ring_{-7}$ _3	qft	71	38	51	15	24	52.94	-60	77	60	42	45.45	30
$ring_{-}7_{-}3$	wstate	73	45	0	0	9	nan	nan	45	45	40	11.11	11.11
$ring_7_3$	qftentangled	78	42	51	24	30	41.18	-25	81	73	49	39.51	32.88
$ring_7_3$	vqe	83	21	0	0	15	nan	nan	21	21	29	-38.1	-38.1
$ring_7_3$	qaoa	95	31	24	9	27	-12.5	-200	54	48	45	16.67	6.25
$ring_7_3$	realamprandom	130	37	120	72	60	50	16.67	129	128	66	48.84	48.44
$ring_7_3$	twolocalrandom	130	37	120	48	60	50	-25	129	102	66	48.84	35.29
$ring_{-7}$	su2random	150	41	120	51	60	50	-17.65	138	120	70	49.28	41.67
ring_7_3	qnn	154	58 79	93	36	66	29.03	-83.33	122	122	84	31.15	31.15
$ring_{-}7_{-}3$ $ring_{-}7_{-}3$	portfolioqaoa random	$\frac{195}{223}$	72 97	120 60	$\begin{array}{c} 51 \\ 12 \end{array}$	87 66	27.5 -10	-70.59 -450	$\frac{157}{157}$	161 106	110 121	29.94 $22.93$	31.68 -14.15
$ring_{-7}$ 3	portfoliovqe	310	107	120	48	93	$\frac{-10}{22.5}$	-430 -93.75	179	193	$121 \\ 125$	30.17	35.23
full_5_4	ghz	7	7	0	0	0	nan	-33.75 nan	7	7	7	0	0
full_5_4	dj	36	11	0	3	0	nan	100	11	14	11	0	21.43
full_5_4	graphstate	50	21	0	6	0	nan	100	21	26	21	0	19.23
full_5_4	qft	71	38	0	6	0	nan	100	38	46	38	0	17.39
full_5_4	wstate	73	45	0	0	0	nan	nan	45	45	45	0	0
$full_5_4$	qftentangled	78	42	0	6	0	nan	100	42	63	42	0	33.33
$full_5_4$	vqe	83	21	0	0	0	nan	nan	21	21	21	0	0
$full_5_4$	qaoa	95	31	0	3	0	nan	100	31	42	31	0	26.19
$full_5_4$	realamprandom	130	37	0	45	0	nan	100	37	103	37	0	64.08
full_5_4	twolocalrandom	130	37	0	45	0	nan	100	37	99	37	0	62.63
full_5_4	su2random	150	41	0	15	0	nan	100	41	81	41	0	49.38
full_5_4	qnn	154	58	0	9	0	nan	100	58	87	58	0	33.33
full_5_4	portfolioqaoa	195	72	0	42	0	nan	100	72	164	72	0	56.1
full_5_4	random	223	97	0	12	0	nan	100	97 107	106	97	0	8.49
full_5_4	portfoliovqe	$\frac{310}{7}$	$\frac{107}{7}$	0 6	48	$0 \\ 3$	nan 50	100	$107 \\ 13$	$\frac{172}{7}$	107	$0 \\ 38.46$	37.79 -14.29
$grid_{-}6_{-}4$ $grid_{-}6_{-}4$	$_{ m ghz}$	$\begin{array}{c} 7 \\ 36 \end{array}$	7 11	18	0 9	3	50 83.33	$\begin{array}{c} \mathrm{nan} \\ 66.67 \end{array}$	$\begin{array}{c} 13 \\ 22 \end{array}$	$\begin{array}{c} 7 \\ 20 \end{array}$	8 12	$\frac{38.46}{45.45}$	-14.29 40
g11u_0_4	uj	90	11	10	9	ა	იი.ეე	00.07		40	14	40.40	40

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
grid_6_4	graphstate	50	21	12	3	3	75	0	32	24	21	34.38	12.5
grid_6_4	qft	71	38	33	15	18	45.45	-20	70	54	34	51.43	37.04
$grid_6_4$	wstate	73	45	15	0	3	80	nan	51	45	46	9.8	-2.22
$grid_{-}6_{-}4$	qftentangled	78	42	33	18	27	18.18	-50	78	63	48	38.46	23.81
$grid_{-}6_{-}4$	vqe	83	21	6	0	12	-100	nan	26	21	25	3.85	-19.05
$grid_6_4$	qaoa	95	31	6	3	9	-50	-200	31	42	38	-22.58	9.52
$grid_6_4$	real amprandom	130	37	75	42	45	40	-7.14	143	91	60	58.04	34.07
$grid_6_4$	two local random	130	37	75	42	45	40	-7.14	143	91	60	58.04	34.07
$grid_6_4$	su2random	150	41	75	42	45	40	-7.14	155	97	64	58.71	34.02
grid_6_4	qnn	154	58	48	30	51	-6.25	-70	122	98	78	36.07	20.41
grid_6_4	portfolioqaoa	195	72	75	51	57	24	-11.76	187	155	91	51.34	41.29
grid_6_4	random	223	97	36	12	21	41.67	-75	162	106	106	34.57	0
grid_6_4	portfoliovqe	310	107	75	42	48	36	-14.29	192	171	117	39.06	31.58
ring_5_4	ghz	7	7 11	0	0	9	nan	nan	7	7 18	8 12	-14.29 50	-14.29
ring_5_4	dj graphstate	36 50	21	9	$\frac{3}{6}$	5 6	66.67 -100	$0 \\ 0$	$\begin{array}{c} 24 \\ 25 \end{array}$	$\frac{18}{22}$	$\frac{12}{21}$	50 16	$33.33 \\ 4.55$
$ring_5_4$ $ring_5_4$	qft	71	38	27	15	18	33.33	-20	65	60	43	33.85	28.33
ring_5_4	wstate	73	45	0	0	9	nan	nan	45	45	40	11.11	11.11
ring_5_4	qftentangled	78	42	27	21	30	-11.11	-42.86	69	76	49	28.99	35.53
ring_5_4	vqe	83	21	0	0	15	nan	nan	21	21	29	-38.1	-38.1
ring_5_4	qaoa	95	31	18	9	27	-50	-200	53	48	$\frac{26}{45}$	15.09	6.25
ring_5_4	realamprandom	130	37	57	48	60	-5.26	-25	86	107	66	23.26	38.32
ring_5_4	twolocalrandom	130	37	57	51	60	-5.26	-17.65	86	112	66	23.26	41.07
$ring_{-}5_{-}4$	su2random	150	41	57	51	60	-5.26	-17.65	96	113	70	27.08	38.05
$ring_5_4$	qnn	154	58	48	39	nan	nan	nan	95	136	nan	nan	nan
$ring_5_4$	portfolioqaoa	195	72	57	51	87	-52.63	-70.59	116	159	110	5.17	30.82
$\operatorname{ring}_{-}5_{-}4$	random	223	97	24	15	51	-112.5	-240	120	140	114	5	18.57
$\operatorname{ring}_{-}5_{-}4$	portfoliovqe	310	107	57	48	93	-63.16	-93.75	146	193	125	14.38	35.23
$t_{horizontal_5_4}$	ghz	7	7	9	3	6	33.33	-100	16	10	9	43.75	10
$t_{horizontal_5_4}$	dj	36	11	24	3	3	87.5	0	37	14	12	67.57	14.29
t_horizontal_5_4	graphstate	50	22	12	9	9	25	0	35	28	20	42.86	28.57
t_horizontal_5_4	qft	71	38	48	15	24	50	-60	82	60	42	48.78	30
t_horizontal_5_4	wstate	73	45	18	0	6	66.67	nan	58	45	39	32.76	13.33
t_horizontal_5_4	qftentangled	78 83	$\frac{42}{21}$	60 12	$\begin{array}{c} 21 \\ 0 \end{array}$	33 12	45	-57.14	90 33	76 $21$	$\frac{48}{25}$	$46.67 \\ 24.24$	36.84 $-19.05$
t_horizontal_5_4 t_horizontal_5_4	vqe	95	31	33	9	$\frac{12}{24}$	$0 \\ 27.27$	nan -166.67	33 100	48	$\frac{25}{45}$	$\frac{24.24}{55}$	6.25
t_horizontal_5_4	qaoa realamprandom	130	$\frac{31}{37}$	117	48	60	48.72	-100.07 -25	185	107	66	64.32	38.32
t_horizontal_5_4	twolocalrandom	130	37	117	72	60	48.72	16.67	185	113	66	64.32	41.59
t_horizontal_5_4	su2random	150	41	117	72	60	48.72	16.67	198	135	70	64.65	48.15
t_horizontal_5_4	qnn	154	58	81	39	66	18.52	-69.23	172	131	84	51.16	35.88
t_horizontal_5_4	portfolioqaoa	195	72	117	48	87	25.64	-81.25	252	153	110	56.35	28.1
$t_{horizontal_5_4}$	random	223	97	36	12	66	-83.33	-450	151	106	121	19.87	-14.15
$t_{horizontal_5_4}$	portfoliovqe	310	107	117	69	93	20.51	-34.78	239	187	125	47.7	33.16
$t_{vertical_5_4}$	ghz	7	7	9	3	6	33.33	-100	16	10	9	43.75	10
$t_{vertical_5_4}$	$\mathrm{d}\mathrm{j}$	36	11	24	3	3	87.5	0	37	18	12	67.57	33.33
$t_{vertical_5_4}$	graphstate	50	22	12	9	9	25	0	35	28	20	42.86	28.57
$t_{vertical_5_4}$	qft	71	38	48	18	24	50	-33.33	82	59	42	48.78	28.81
$t_{vertical_5_4}$	wstate	73	45	18	0	6	66.67	nan	58	45	39	32.76	13.33
$t_{vertical_5_4}$	qftentangled	78	42	60	24	33	45	-37.5	90	73	48	46.67	34.25
$t_{vertical_5_4}$	vqe	83	21	12	0	12	0	nan	33	21	25	24.24	-19.05
$t_{\text{vertical}}_{-5}_{-4}$	qaoa	95	31	33	9	24	27.27	-166.67	100	48	45	55	6.25
t_vertical_5_4	realamprandom	130	37	117	51	60	48.72	-17.65	185	109	66	64.32	39.45
t_vertical_5_4	twolocalrandom	130	37	117	48	60	48.72	-25	185	107	66	64.32	38.32
t_vertical_5_4	su2random	150	41	117	48	60 66	48.72	-25 27 5	198	110	70 84	64.65	36.36
t_vertical_5_4	qnn portfoliogooo	154	58 72	81	48	66	18.52	-37.5 70.50	172	127 164	84	51.16	33.86
t_vertical_5_4 t_vertical_5_4	portfolioqaoa random	$\frac{195}{223}$	72 97	$\frac{117}{36}$	$\begin{array}{c} 51 \\ 12 \end{array}$	87 66	25.64 -83.33	-70.59 -450	$252 \\ 151$	164 106	110 121	56.35 $19.87$	32.93 -14.15
t_vertical_5_4 t_vertical_5_4	random portfoliovqe	$\frac{223}{310}$	97 107	30 117	48	93	-83.33 20.51	-450 -93.75	$\frac{151}{239}$	100 $193$	$\frac{121}{125}$	19.87 47.7	-14.15 $35.23$
line_1_20	ghz	310 7	107 7	0	40	95 18	20.51 nan	-95.75 nan	239 7	193 7	125	-28.57	33.23 -28.57
line_1_20	dj	36	11	36	6	6	83.33	0	40	$\frac{7}{24}$	9 14	-20.51 65	41.67
line_1_20	graphstate	50	$\frac{11}{22}$	12	9	12	0	-33.33	32	28	21	34.38	25
	Prahmanc			14	9	14	· ·	50.00	- 52	20		01.00	20

Table 1: Additional swap gates and circuit depth,  $n\,=\,5$ 

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
line_1_20	qft	71	38	72	24	24	66.67	0	92	57	42	54.35	26.32
$line_1_20$	wstate	73	45	0	0	15	nan	nan	45	45	33	26.67	26.67
$line_1_20$	qftentangled	78	42	72	24	36	50	-50	96	73	50	47.92	31.51
$line_1_20$	vqe	83	21	0	0	15	nan	nan	21	21	24	-14.29	-14.29
$line_1_20$	qaoa	95	31	48	12	18	62.5	-50	106	42	39	63.21	7.14
$line_1_20$	realamprandom	130	37	180	69	93	48.33	-34.78	206	113	59	71.36	47.79
$line_1_20$	two local random	130	37	180	69	93	48.33	-34.78	206	113	59	71.36	47.79
$line_1_20$	su2random	150	41	180	72	93	48.33	-29.17	219	135	63	71.23	53.33
$line_1_20$	qnn	154	58	120	48	84	30	-75	172	127	80	53.49	37.01
$line_1_20$	portfolioqaoa	195	72	180	66	93	48.33	-40.91	255	159	90	64.71	43.4
$line_1_20$	random	223	97	63	12	30	52.38	-150	160	106	99	38.12	6.6
$line_1_20$	portfoliovqe	310	107	180	69	90	50	-30.43	242	187	126	47.93	32.62

Table 2: Additional swap gates and circuit depth, n=10

Mil. 20.1	layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
Fall   Pall	full 20 1	ghz		12	0	0	0	nan	nan	12	12	12	0	0
Full   Dull   Part														
Full 20.1   vge														
Mill   10.1		~ -												
Mil. 19.1   qft														
Mull 201.														
Fall   20.1   order   coalumproade   35.5   57.5   57.5   57.5   57.5   57.5   50.5   50.5   fall   20.1   coalumproade   335   57.5		_												
Full 20.1   reals approach   reals app		_							nan					
Full 20.1   two local random   335   57   0   0   0   near   near   57   57   57   0   0   0   0   0   0   0   0   0		•							nan					
Fall   20.1	$full_20_1$	_	335	57	0	0		nan	nan	57	57	57	0	0
Fall   20.1	$full_20_1$	su2random	375	61	0	0	0	nan	nan	61	61	61	0	0
full_20.1         randome         646         15.5         0         0         0         nonan         nana         15.5         15.5         15.7         0         0           full_10.2         glu         12         12         0         0         0         nana         100         21.7         17         0         0           full_10.2         dig         17         7.7         0         6         0         nan         100         12         15         12         0         15           full_10.2         graphstate         163         90         0         3         0         nan         100         90         93         90         0         3.2           full_10.2         qeo         168         26         0         6         0         nan         100         90         3         3         0         0         3         3         0         13         3         4         3         4         4         0         3         3         1         0         1         2         2         2         0         3         3         1         1         2         2         1         3 <t< td=""><td><math>full_20_1</math></td><td>qnn</td><td>459</td><td>108</td><td>0</td><td>0</td><td>0</td><td>nan</td><td>nan</td><td>108</td><td>108</td><td>108</td><td>0</td><td>0</td></t<>	$full_20_1$	qnn	459	108	0	0	0	nan	nan	108	108	108	0	0
full.10.2         optoficiorege         1145         217         0         0         0         nam         nam         217         217         20         0           full.10.2         glax         12         12         0         3         0         nam         100         12         12         0         0           full.10.2         graphstate         100         22         0         3         0         nam         100         22         25         22         0         12           full.10.2         westate         168         26         0         6         0         nam         100         26         38         26         0         3.33           full.10.2         quas         190         34         0         0         0         nam         100         82         178         80         3.33           full.10.2         qftentanagled         282         82         0 <td><math>full_20_1</math></td> <td>portfolioqaoa</td> <td>615</td> <td>132</td> <td>0</td> <td>0</td> <td>0</td> <td>nan</td> <td>nan</td> <td>132</td> <td>132</td> <td>132</td> <td>0</td> <td>0</td>	$full_20_1$	portfolioqaoa	615	132	0	0	0	nan	nan	132	132	132	0	0
Full.10.2   chy   12   12   10   6   0   nan   100   17   15   12   0   20   15   16   11   11   11   11   12   12   0   3   0   nan   100   17   2   17   0   15   15   16   11   11   11   12   12   13   13   14   15   15   15   15   15   15   15	$full_20_1$	random	646	155	0	0	0	nan	nan	155	155	155	0	0
full_10_2         dj         79         117         0         3         0         nan         100         12         20         15         12         12         11         100         20         25         25         20         12         12         11         11         20         15         22         20         3         0         nan         100         90         35         90         0         3,23           full_10_2         qoao         190         34         0         0         0         nan         100         26         38         26         0         31,58         0         31,58         0         31,58         0         31,50         0         nan         100         82         18         0         0         0         nan         100         82         18         0         0         0         nan         100         82         18         0         0         0         nan         100         62         18         0         0         0         nan         100         62         22         57         0         53,93         18         0         76         1         nan         100 <td< td=""><td><math>full_20_1</math></td><td>portfoliovqe</td><td>1145</td><td>217</td><td>0</td><td>0</td><td>0</td><td>nan</td><td>nan</td><td>217</td><td>217</td><td>217</td><td>0</td><td>0</td></td<>	$full_20_1$	portfoliovqe	1145	217	0	0	0	nan	nan	217	217	217	0	0
full 10.2 by a systate         100         22 by 3         0         nan         100         22 by 3         2 by 0         13 by 10           full 10.2 by a systate         163 by 0         0         0         3         0         nan         100         26 by 3         26 by 0         0         3.3 sh 10           full 10.2 by a systate         168 by 2         26 by 0         0         0         0         nan         100         26 by 3         26 by 0         31 by 0           full 10.2 by a systate         10 by 2 by 2 by 2 by 3         0         0         0         nan         100 by 6         78 by 15 by 5         0         53.93 by 15	$full_10_2$	$\operatorname{ghz}$	12	12	0	6	0	nan	100	12	15	12	0	20
full 10 2         wstate         163         90         0         3         0         nan         100         90         93         90         0         3.33         stall 10.2         qaoa         169         34         0         0         0         nan         nan         26         38         26         0         3.15 stall         3.15 s	$full_10_2$		79		0	3	0	nan	100				0	
full.10.2         vage         168         26         0         6         0         nan         100         26         38         26         0         31.58           full.10.2         qften dangled         270         78         0         33         0         nan         100         78         151         78         0         48.34           full.10.2         qftentangled         282         28         0         36         0         nan         100         52         223         57         0         74.44           full.10.2         twolocalrandom         335         57         0         99         0         nan         100         61         25         61         75.16           full.10.2         qnn         459         108         0         78         0         nan         100         61         245         61         75.16           full.10.2         qnr         459         108         0         78         0         nan         100         152         333         155         60         60           full.10.2         portfolioqaoa         1145         217         0         18         0         nan <td></td> <td><math>\operatorname{graphstate}</math></td> <td></td> <td></td> <td>0</td> <td></td> <td></td> <td>nan</td> <td>100</td> <td></td> <td></td> <td></td> <td></td> <td></td>		$\operatorname{graphstate}$			0			nan	100					
full_10_2         qaea         190         34         0         0         nan         nan         34         34         0         0           full_10_2         qftentangled         282         82         0         36         0         nan         100         78         151         78         0         48,34           full_10_2         eralamprandom         335         57         0         99         0         nan         100         57         223         77         0         74,44           full_10_2         twolocalrandom         335         57         0         99         0         nan         100         61         25         70         59.86           full_10_2         quandom         459         108         0         8         0         nan         100         168         28         10         6         14.34         10         6         12         57         0         51         0         78         0         nan         100         158         33         132         0         66.99         10         10         10         12         20         66.99         10         10         10         12		wstate			0			nan						
full_10_2         qft         270         78         0         33         0         nan         100         78         151         78         0         48.34           full_10_2         realamprandom         335         57         0         99         0         nan         100         57         223         57         0         54.44           full_10_2         twolocalrandom         335         57         0         51         0         nan         100         57         122         57         0         59.86           full_10_2         qmn         459         108         0         78         0         nan         100         16         245         11         0         56.98           full_10_2         qmn         459         108         0         78         0         nan         100         108         20         0         61.43           full_10_2         qmn         459         108         0         nan         100         102         217         0         61.43           full_10_2         portfolioqaoa         1145         217         0         18         0         nan         100         121		vqe			0	6		nan	100					31.58
full_10_2         qftentangled         282         82         0         36         0         nan         100         82         178         82         0         53,93           full_10_2         twolocalrandom         335         57         0         51         0         nan         100         57         122         37         0         59,86           full_10_2         su2random         375         61         0         96         0         nan         100         61         245         61         0         75,14           full_10_2         qportfolioqao         615         132         0         81         0         nan         100         125         353         155         0         66.96           full_10_2         portfolioqao         615         15         0         78         0         nan         100         125         351         155         0         66.96           full_10_2         portfoliowe         1145         217         0         12         12         2         0         nan         100         21         20         0         60         60         60         60         60         60         6								nan						-
Full   10.2   realamprandom   335   57   0   99   0   nan   100   57   223   57   0   59.86   101		_						nan						
full.10.2         twolocalrandom         335         57         0         51         0         nan         100         57         124         57         0         59.86         full.10.2         qun         459         108         0         78         0         nan         100         61         245         61         0         75.1           full.10.2         oportfolioqaa         615         132         0         81         0         nan         100         132         363         132         0         66.09           full.10.2         portfolioqaa         615         157         0         18         0         nan         100         132         363         132         0         66.09           full.10.2         portfolioqaa         1145         217         0         18         0         nan         100         217         261         217         0         16.86           grid.9.2         dj         112         12         12         3         27         -12.5         nan         12         29         20         23         -53.33           grid.9.2         wstate         163         90         21         0		•						nan						
full.10.2         su2random         375         61         0         96         0         nan         100         61         245         61         0         75.1           full.10.2         oportfolioqaoa         615         132         0         81         0         nan         100         132         363         132         0         63.64           full.10.2         portfolioqao         646         155         0         78         0         nan         100         155         333         155         0         56.09           full.10.2         portfoliovqe         1145         217         0         18         0         nan         100         255         333         155         0         56.09           grid.9.2         glx         12         12         2         2.5         800         24         12         19         20.83         23.33         26.7         22         25         40.48         21.36         42         12         12         80.20         29         12.25         800         24         12         12         90.20         13         32.21         12.21         12.5         80.0         22         22		-						nan						
full.10.2         qnn         459         108         0         78         0         nan         100         132         236         132         0         61.43           full.10.10.2         portfolioqae         615         135         0         81         0         nan         100         132         363         132         0         63.64           full.10.2         portfoliovqe         1145         217         0         18         0         nan         100         217         261         217         0         16.86           grid.9.2         glz         12         12         12         21         25         80         24         12         29         26         40         23         38         23         33         33         33         33         33         33         33         33         33         33         33         33         34         43         43														
full.10.2         portfolioqaoa         615         132         0         81         0         nan         100         135         363         132         0         63.64           full.10.2         portfolioqea         1145         217         0         18         0         nan         100         217         261         217         0         16.86           grid.9.2         ghz         112         12         12         12         12         12         80.67         0         82         38         22         73.17         42.11           grid.9.2         graphstate         100         22         24         0         27         -12.5         nan         102         90         57         44.12         36.67           grid.9.2         wstate         168         26         9         0         30         -42.86         nan         102         90         57         44.12         36.67           grid.9.2         qaoa         190         34         63         9         78         23.31         -766.67         145         45         46         68.28         -2.22           grid.9.2         qft         270         78 <td></td>														
full.10.2         random         646         155         0         78         0         nan         100         155         353         155         0         56.09           full.10.2         portfoliove         1145         217         0         18         0         nan         100         217         261         217         0         16.86           grid.9.2         gho         12         86.67         0         82         38         22         73.17         42.11           grid.9.2         graphstate         100         22         24         0         27         -12.5         nan         102         90         57         44.12         36.64           grid.9.2         wate         168         26         9         0         39         -33.33         nan         31         26         33         -66         82.89         91         30         39         14         24         45         46		•												
full.10.2         portfoliovqe         1145         217         0         18         0         nan         100         217         261         217         0         16.86           grid.9.2         ghz         12         12         12         12         3         27         -125         -800         24         12         19         20.83         -58.33           grid.9.2         graphstate         100         22         24         0         27         -12.5         nan         42         22         25         40.48         -13.64           grid.9.2         wstate         168         26         9         0         39         -33.33         nan         102         90         77         44.12         36.67           grid.9.2         qaoa         190         34         63         9         78         -23.81         -766.67         145         45         46         68.28         -22.22           grid.9.2         qftentangled         282         827         96         180         35.48         -87.5         288         186         120         58.33         35.48           grid.9.2         twolocalrandom         335         57<		• •												
grid.9.2         ghz         12         12         12         12         12         3         27         -15         -800         24         12         19         20.83         -58.33           grid.9.2         graphstate         100         22         24         0         27         -12.5         nan         42         22         25         40.48         -13.64         grid.9.2         wstate         163         90         21         0         30         -42.86         nan         102         90         57         44.12         36.67           grid.9.2         vqe         168         26         9         0         30         -33.33         nan         102         90         57         44.12         36.67           grid.9.2         qft         270         78         279         96         180         35.48         -766.67         145         45         46         68.28         2.22         22         grid.9.2         qftentangled         282         82         182         199         94.12         288         167         135         53.12         191.6         63         33.48         43.12         250         151         74.45 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>														
grid.9.2         dj         79         17         90         12         12         86.67         0         82         38         22         73.17         42.11           grid.9.2         graphstate         100         22         24         0         27         -12.5         nan         42         22         25         40.48         -13.64           grid.9.2         wetate         168         26         9         0         30         -42.86         nan         102         90         57         44.12         36.67           grid.9.2         qaoa         190         34         63         9         78         -23.81         -766.67         145         45         46         62.28         2.22           grid.9.2         qftentangled         282         82         282         102         198         29.79         -94.12         288         167         135         53.12         19.16           grid.9.2         qftentangled         282         822         102         198         29.79         -94.12         288         167         135         53.12         19.16           grid.9.2         qftentangled         285         279		• •												
grid.9.2         graphstate         100         22         24         0         27         -12.5         nan         42         22         25         40.48         -13.64           grid.9.2         wstate         163         90         21         0         30         -42.86         nan         102         90         57         44.12         36.67           grid.9.2         qaoa         190         34         63         9         78         -23.81         -766.67         145         45         46         68.28         -22.22           grid.9.2         qft         270         78         279         96         180         35.48         -87.5         288         186         120         58.33         35.48           grid.9.2         qftentangled         282         82         120         198         29.79         -94.12         288         167         135         53.12         19.16           grid.9.2         twolocalrandom         335         57         690         222         321         53.48         -17.58         591         307         151         74.45         50.81           grid.9.2         qun         459         108		~												
grid.9.2         wstate         163         90         21         0         30         -42.86         nan         102         90         57         44.12         36.67           grid.9.2         vqe         168         26         9         0         39         -333.33         nan         31         26         33         -645         -26.92           grid.9.2         qft         270         78         279         96         180         35.48         -87.5         288         186         120         58.33         35.48           grid.9.2         qftentangled         282         82         282         102         198         29.79         -94.12         288         167         135         53.12         19.16           grid.9.2         twolocalrandom         335         57         690         222         321         53.48         -17.58         591         307         151         74.45         59.6           grid.9.2         qun         459         108         456         165         240         47.37         -45.45         537         251         174         67.6         30.68           grid.9.2         portfolioqaoa         615 <td>0</td> <td></td>	0													
grid 9.2         vqe         168         26         9         0         39         -333.33         na         31         26         33         -6.45         -26.92           grid 9.2         qaoa         190         34         63         9         78         -23.81         -766.67         145         45         46         68.28         -22.22           grid 9.2         qftentangled         282         82         282         102         198         29.79         -94.12         288         166         120         53.31         35.48           grid 9.2         realamprandom         335         57         690         222         321         53.48         -17.58         591         250         151         74.45         39.6           grid 9.2         twolocalrandom         335         57         690         283         321         53.48         -17.58         591         307         151         74.45         59.81           grid 9.2         qua         459         108         456         165         240         47.37         -45.45         537         251         17.45         50.81           grid 9.2         portfolioqaoa         615		~ -												
grid.9.2         qaoa         190         34         63         9         78         -23.81         -766.67         145         45         46         68.28         -22.22           grid.9.2         qftentangled         282         82         282         102         198         29.79         -94.12         288         167         135         53.12         19.16           grid.9.2         realamprandom         335         57         690         223         321         53.48         -44.59         591         250         151         74.45         39.6           grid.9.2         twolocalrandom         375         61         690         288         321         53.48         -17.58         591         307         151         74.45         50.81           grid.9.2         qm         459         108         456         165         240         47.37         -45.45         537         251         174         45.66         36.8           grid.9.2         portfolioqao         615         132         690         234         384         43.5         -64.1         803         347         248         69.12         28.53           grid.9.2         portfol														
grid_9_2         qft         270         78         279         96         180         35.48         -87.5         288         186         120         58.33         35.48           grid_9_2         qftentangled         282         82         282         102         198         29.79         -94.12         288         167         135         53.12         19.16           grid_9_2         realamprandom         335         57         690         222         321         53.48         -14.59         591         250         151         74.45         39.6           grid_9_2         twolocalrandom         335         57         690         228         321         53.48         -17.58         591         307         151         74.45         50.81           grid_9_2         su2random         459         108         456         165         240         47.37         -45.45         537         251         174         67.6         30.68           grid_9_2         portfolioqaa         615         132         690         276         387         43.51         74.64         45.86           grid_9_2         portfolioqaa         615         122         690	0	-			_									
grid.9.2         qftentangled         282         82         282         102         198         29.79         -94.12         288         167         135         53.12         19.16           grid.9.2         realamprandom         335         57         690         222         321         53.48         -14.59         591         250         151         74.45         39.6           grid.9.2         twolocalrandom         335         57         690         288         321         53.48         -17.58         591         307         151         74.45         50.81           grid.9.2         qnn         459         108         456         165         240         47.37         -45.45         537         251         174         67.6         30.88           grid.9.2         portfolioqaoa         615         132         690         234         384         44.35         -64.1         803         347         248         69.12         28.53           grid.9.2         portfolioqaoa         615         127         690         276         387         43.91         -40.22         951         530         284         70.14         46.22           ring.10.2														
grid.9.2         realamprandom         335         57         690         222         321         53.48         -44.59         591         250         151         74.45         39.6           grid.9.2         twolocalrandom         335         57         690         273         321         53.48         -17.58         591         307         151         74.45         50.81           grid.9.2         su2random         459         108         456         165         240         47.37         -45.45         537         251         174         67.6         30.68           grid.9.2         portfolioqaoa         615         132         690         234         384         44.35         -64.1         803         347         248         69.12         28.53           grid.9.2         portfolioqao         616         155         285         177         225         21.05         -27.12         455         309         185         59.34         40.13           grid.9.2         portfoliovqe         1145         217         690         276         387         43.91         -40.22         951         530         284         70.14         46.22           ring.10.2<	0	_												
grid.9.2         twolocalrandom         335         57         690         273         321         53.48         -17.58         591         307         151         74.45         50.81           grid.9.2         su2random         375         61         690         288         321         53.48         -11.46         619         290         157         74.64         45.86           grid.9.2         qnn         459         108         456         165         240         47.37         -45.45         537         251         174         67.6         30.68           grid.9.2         portfolioqaoa         615         132         690         234         384         44.35         -64.1         803         347         248         69.12         28.53           grid.9.2         random         646         155         285         177         225         21.05         -27.12         455         309         185         59.34         40.13           grid.9.2         ghz         portfoliovqe         1145         217         690         276         387         43.91         -40.22         951         530         284         70.14         46.22           ring	~													
grid.9.2         su2random         375         61         690         288         321         53.48         -11.46         619         290         157         74.64         45.86           grid.9.2         qnn         459         108         456         165         240         47.37         -45.45         537         251         174         67.6         30.68           grid.9.2         portfolioqaoa         615         132         690         234         384         44.35         -64.1         803         347         248         69.12         28.53           grid.9.2         portfoliovqe         1145         217         690         276         387         43.91         -40.22         951         530         284         70.14         46.42           ring.10.2         ghz         12         12         0         15         51         nan         -240         12         24         21         -75         12.5           ring.10.2         ghz         17         78         21         21         73.08         0         64         46         21         -75         12.5           ring.10.2         graphstate         163         90	~	_												
grid.9.2         qnn         459         108         456         165         240         47.37         -45.45         537         251         174         67.6         30.68           grid.9.2         portfolioqaoa         615         132         690         234         384         44.35         -64.1         803         347         248         69.12         28.53           grid.9.2         portfoliovqe         1145         217         690         276         387         43.91         -40.22         951         530         284         70.14         46.42           ring.10.2         ghz         12         12         0         15         51         nan         -240         12         24         21         -75         12.5           ring.10.2         ghz         79         17         78         21         21         73.08         0         64         46         21         67.19         54.35           ring.10.2         graphstate         100         22         27         18         51         -88.99         -183.33         42         28         33         21.43         -17.86           ring.10.2         wstate         163	~													
grid-9-2         portfolioqaoa         615         132         690         234         384         44.35         -64.1         803         347         248         69.12         28.53           grid-9-2         random         646         155         285         177         225         21.05         -27.12         455         309         185         59.34         40.13           grid-9-2         portfoliovqe         1145         217         690         276         387         43.91         -40.22         951         530         284         70.14         46.42           ring-10-2         ghz         12         12         0         15         51         nan         -240         12         24         21         -75         12.5           ring-10-2         ghz         17         78         21         21         73.08         0         64         46         21         67.19         54.35           ring-10-2         graphstate         100         22         27         18         51         -88.89         -183.33         42         28         33         21.43         -17.86           ring-10-2         vqe         168         26	~													
grid.9_2         random         646         155         285         177         225         21.05         -27.12         455         309         185         59.34         40.13           grid.9_2         portfoliovqe         1145         217         690         276         387         43.91         -40.22         951         530         284         70.14         46.42           ring.10_2         ghz         12         12         12         0         15         51         nan         -240         12         24         21         -75         12.5           ring.10_2         dj         79         17         78         21         21         73.08         0         64         46         21         67.19         54.35           ring.10_2         graphstate         100         22         27         18         51         -88.89         -183.33         42         28         33         21.43         -17.86           ring.10_2         wstate         163         90         0         21         57         nan         -171.43         90         102         57         36.67         44.12           ring.10_2         qaoa         190 <td>~</td> <td></td>	~													
grid_9_2         portfoliovqe         1145         217         690         276         387         43.91         -40.22         951         530         284         70.14         46.42           ring_10_2         ghz         12         12         0         15         51         nan         -240         12         24         21         -75         12.5           ring_10_2         dj         79         17         78         21         21         73.08         0         64         46         21         67.19         54.35           ring_10_2         graphstate         100         22         27         18         51         -88.89         -183.33         42         28         33         21.43         -17.86           ring_10_2         wstate         163         90         0         21         57         nan         -171.43         90         102         57         36.67         44.12           ring_10_2         vqe         168         26         0         3         90         nan         -2900         26         35         45         -73.08         -28.57           ring_10_2         qft         270         78 <th< td=""><td>~</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>	~													
ring_10_2         dj         79         17         78         21         21         73.08         0         64         46         21         67.19         54.35           ring_10_2         graphstate         100         22         27         18         51         -88.89         -183.33         42         28         33         21.43         -17.86           ring_10_2         wstate         163         90         0         21         57         nan         -171.43         90         102         57         36.67         44.12           ring_10_2         vqe         168         26         0         3         90         nan         -2900         26         35         45         -73.08         -28.57           ring_10_2         qaoa         190         34         120         24         66         45         -175         154         42         48         68.83         -14.29           ring_10_2         qft         270         78         330         147         165         50         -12.24         233         179         104         55.36         41.9           ring_10_2         qftentangled         282         82	~	portfoliovqe	1145	217	690	276	387	43.91			530	284	70.14	
ring_10_2         dj         79         17         78         21         21         73.08         0         64         46         21         67.19         54.35           ring_10_2         graphstate         100         22         27         18         51         -88.89         -183.33         42         28         33         21.43         -17.86           ring_10_2         wstate         163         90         0         21         57         nan         -171.43         90         102         57         36.67         44.12           ring_10_2         vqe         168         26         0         3         90         nan         -2900         26         35         45         -73.08         -28.57           ring_10_2         qaoa         190         34         120         24         66         45         -175         154         42         48         68.83         -14.29           ring_10_2         qft         270         78         330         147         165         50         -12.24         233         179         104         55.36         41.9           ring_10_2         qftentangled         282         82	~	$\operatorname{ghz}$	12	12	0		51	nan	-240	12	24	21	-75	12.5
ring_10_2         graphstate         100         22         27         18         51         -88.89         -183.33         42         28         33         21.43         -17.86           ring_10_2         wstate         163         90         0         21         57         nan         -171.43         90         102         57         36.67         44.12           ring_10_2         vqe         168         26         0         3         90         nan         -2900         26         35         45         -73.08         -28.57           ring_10_2         qaoa         190         34         120         24         66         45         -175         154         42         48         68.83         -14.29           ring_10_2         qft         270         78         330         147         165         50         -12.24         233         179         104         55.36         41.99           ring_10_2         qftentangled         282         82         330         153         165         50         -7.84         237         219         107         54.85         51.14           ring_10_2         realamprandom         335	$ring_10_2$		79	17	78	21	21	73.08	0	64	46	21	67.19	54.35
ring_10_2         vqe         168         26         0         3         90         nan         -2900         26         35         45         -73.08         -28.57           ring_10_2         qaoa         190         34         120         24         66         45         -175         154         42         48         68.83         -14.29           ring_10_2         qft         270         78         330         147         165         50         -12.24         233         179         104         55.36         41.9           ring_10_2         qftentangled         282         82         330         153         165         50         -7.84         237         219         107         54.85         51.14           ring_10_2         realamprandom         335         57         885         390         516         41.69         -32.31         522         360         215         58.81         40.28           ring_10_2         twolocalrandom         335         57         885         414         516         41.69         -24.64         522         406         215         58.81         47.04           ring_10_2         qnn         459 <td></td> <td>graphstate</td> <td>100</td> <td>22</td> <td>27</td> <td>18</td> <td>51</td> <td>-88.89</td> <td>-183.33</td> <td>42</td> <td>28</td> <td>33</td> <td>21.43</td> <td>-17.86</td>		graphstate	100	22	27	18	51	-88.89	-183.33	42	28	33	21.43	-17.86
ring_10_2         qaoa         190         34         120         24         66         45         -175         154         42         48         68.83         -14.29           ring_10_2         qft         270         78         330         147         165         50         -12.24         233         179         104         55.36         41.9           ring_10_2         qftentangled         282         82         330         153         165         50         -7.84         237         219         107         54.85         51.14           ring_10_2         realamprandom         335         57         885         390         516         41.69         -32.31         522         360         215         58.81         40.28           ring_10_2         twolocalrandom         335         57         885         414         516         41.69         -24.64         522         406         215         58.81         47.04           ring_10_2         su2random         375         61         885         366         537         39.32         -46.72         543         336         224         58.75         33.33           ring_10_2         qnn	$ring_10_2$	wstate	163	90	0	21	57	nan	-171.43	90	102	57	36.67	44.12
ring_10_2         qft         270         78         330         147         165         50         -12_24         233         179         104         55_36         41_9           ring_10_2         qftentangled         282         82         330         153         165         50         -7.84         237         219         107         54.85         51.14           ring_10_2         realamprandom         335         57         885         390         516         41.69         -32.31         522         360         215         58.81         40.28           ring_10_2         twolocalrandom         335         57         885         414         516         41.69         -24.64         522         406         215         58.81         47.04           ring_10_2         su2random         375         61         885         366         537         39.32         -46.72         543         336         224         58.75         33.33           ring_10_2         qnn         459         108         663         267         432         34.84         -61.8         440         390         232         47.27         40.51           ring_10_2         portfo	$ring_10_2$	vqe	168	26	0	3	90	nan	-2900	26	35	45	-73.08	-28.57
ring_10_2         qftentangled         282         82         330         153         165         50         -7.84         237         219         107         54.85         51.14           ring_10_2         realamprandom         335         57         885         390         516         41.69         -32.31         522         360         215         58.81         40.28           ring_10_2         twolocalrandom         335         57         885         414         516         41.69         -24.64         522         406         215         58.81         47.04           ring_10_2         su2random         375         61         885         366         537         39.32         -46.72         543         336         224         58.75         33.33           ring_10_2         qnn         459         108         663         267         432         34.84         -61.8         440         390         232         47.27         40.51           ring_10_2         portfolioqaoa         615         132         885         342         594         32.88         -73.68         606         443         292         51.82         34.09           ring_10_2		qaoa	190	34	120	24	66	45	-175	154	42	48	68.83	-14.29
ring_10_2         realamprandom         335         57         885         390         516         41.69         -32.31         522         360         215         58.81         40.28           ring_10_2         twolocalrandom         335         57         885         414         516         41.69         -24.64         522         406         215         58.81         47.04           ring_10_2         su2random         375         61         885         366         537         39.32         -46.72         543         336         224         58.75         33.33           ring_10_2         qnn         459         108         663         267         432         34.84         -61.8         440         390         232         47.27         40.51           ring_10_2         portfolioqaoa         615         132         885         342         594         32.88         -73.68         606         443         292         51.82         34.09           ring_10_2         random         646         155         402         225         423         -5.22         -88         493         379         244         50.51         35.62           ring_10_2	$ring_10_2$	qft												
ring_10_2         twolocalrandom         335         57         885         414         516         41.69         -24.64         522         406         215         58.81         47.04           ring_10_2         su2random         375         61         885         366         537         39.32         -46.72         543         336         224         58.75         33.33           ring_10_2         qnn         459         108         663         267         432         34.84         -61.8         440         390         232         47.27         40.51           ring_10_2         portfolioqaoa         615         132         885         342         594         32.88         -73.68         606         443         292         51.82         34.09           ring_10_2         random         646         155         402         225         423         -5.22         -88         493         379         244         50.51         35.62           ring_10_2         portfoliovqe         1145         217         885         405         636         28.14         -57.04         636         617         298         53.14         51.7	$ring_{-}10_{-}2$													
ring_10_2         su2random         375         61         885         366         537         39.32         -46.72         543         336         224         58.75         33.33           ring_10_2         qnn         459         108         663         267         432         34.84         -61.8         440         390         232         47.27         40.51           ring_10_2         portfolioqaoa         615         132         885         342         594         32.88         -73.68         606         443         292         51.82         34.09           ring_10_2         random         646         155         402         225         423         -5.22         -88         493         379         244         50.51         35.62           ring_10_2         portfoliovqe         1145         217         885         405         636         28.14         -57.04         636         617         298         53.14         51.7	-	_												
ring_10_2     qnn     459     108     663     267     432     34.84     -61.8     440     390     232     47.27     40.51       ring_10_2     portfolioqaoa     615     132     885     342     594     32.88     -73.68     606     443     292     51.82     34.09       ring_10_2     random     646     155     402     225     423     -5.22     -88     493     379     244     50.51     35.62       ring_10_2     portfoliovqe     1145     217     885     405     636     28.14     -57.04     636     617     298     53.14     51.7	-													
ring_10_2     portfolioqaoa     615     132     885     342     594     32.88     -73.68     606     443     292     51.82     34.09       ring_10_2     random     646     155     402     225     423     -5.22     -88     493     379     244     50.51     35.62       ring_10_2     portfoliovqe     1145     217     885     405     636     28.14     -57.04     636     617     298     53.14     51.7	-													
ring_10_2 random 646 155 402 225 423 -5.22 -88 493 379 244 50.51 35.62 ring_10_2 portfoliovqe 1145 217 885 405 636 28.14 -57.04 636 617 298 53.14 51.7	-													
$ring\_10\_2 \qquad portfoliovqe \qquad 1145  217  885  405  636  28.14  -57.04   636  617  298  53.14   51.7$														
tull_7_3 ghz 12 12 0 3 0 nan 100 12 15 12 0 20														
	tull_7_3	ghz	12	12	0	3	U	nan	100	12	15	12	U	20

Table 2: Additional swap gates and circuit depth, n=10

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
full_7_3 full_7_3	dj graphstate	79 100	17 22	48 21	9	9 18	81.25 $14.29$	0 -200	70 43	$\frac{30}{22}$	$\frac{22}{26}$	68.57 $39.53$	26.67 -18.18
full_7_3	wstate	163	90	0	0	0	14.29 nan	nan	90	90	90	39.33 0	0
full_7_3	vqe	168	26	0	0	0	nan	nan	26	26	26	0	0
full_7_3	qaoa	190	34	48	9	15	68.75	-66.67	138	50	42	69.57	16
full_7_3	qft	270	78	168	63	150	10.71	-138.1	236	170	140	40.68	17.65
$full_7_3$	qftentangled	282	82	168	51	150	10.71	-194.12	240	191	144	40	24.61
$full_7_3$	realamprandom	335	57	471	219	141	70.06	35.62	632	299	130	79.43	56.52
$full_7_3$	two local random	335	57	471	135	141	70.06	-4.44	632	266	130	79.43	51.13
$full_7_3$	su2random	375	61	471	195	141	70.06	27.69	657	262	135	79.45	48.47
$full_7_3$	qnn	459	108	294	132	249	15.31	-88.64	531	366	214	59.7	41.53
full_7_3	portfolioqaoa	615	132	471	180	231	50.96	-28.33	845	406	239	71.72	41.13
full_7_3	random	646	155	159	102	132	16.98	-29.41	419	358	179	57.28	50
full_7_3	portfoliovqe	1145	217	471	132	255	45.86	-93.18	878	499	308	64.92	38.28
grid_8_3	ghz	12	12 17	9	9	18	-100	-100 20	21 79	18	18 25	14.29	0
grid_8_3 grid_8_3	dj graphstate	79 100	22	$\frac{108}{42}$	15 6	$\frac{12}{24}$	88.89 $42.86$	-300	60	$\frac{41}{25}$	25 21	68.35 $65$	39.02 $16$
grid_8_3	wstate	163	90	12	3	$\frac{24}{15}$	-25	-300 -400	99	93	65	34.34	30.11
grid_8_3	vqe	168	26	54	3	21	61.11	-600	60	$\frac{35}{35}$	31	48.33	11.43
grid_8_3	qaoa	190	$\frac{20}{34}$	96	21	33	65.62	-57.14	188	53	42	77.66	20.75
grid_8_3	qft	270	78	408	93	183	55.15	-96.77	318	183	119	62.58	34.97
grid_8_3	qftentangled	282	82	393	102	201	48.85	-97.06	314	175	138	56.05	21.14
grid_8_3	realamprandom	335	57	828	225	249	69.93	-10.67	669	245	120	82.06	51.02
$grid_8_3$	twolocalrandom	335	57	828	228	249	69.93	-9.21	669	234	120	82.06	48.72
$grid_8_3$	su2random	375	61	828	234	249	69.93	-6.41	690	260	123	82.17	52.69
$grid_8_3$	qnn	459	108	618	198	288	53.4	-45.45	594	315	181	69.53	42.54
$grid_8_3$	portfolioqaoa	615	132	828	249	450	45.65	-80.72	818	402	273	66.63	32.09
$grid_8_3$	random	646	155	327	165	306	6.42	-85.45	492	350	208	57.72	40.57
$grid_8_3$	portfoliovqe	1145	217	828	255	291	64.86	-14.12	890	477	251	71.8	47.38
$ring_{-7}_{-3}$	ghz	12	12	0	6	51	nan	-750	12	18	25	-108.33	-38.89
$ring_{-7}$	dj	79	17	126	18	24	80.95	-33.33	79	41	19	75.95	53.66
ring_7_3	graphstate	100 163	22 90	45	12	$\frac{45}{66}$	0	-275 -633.33	56 90	28 96	$\frac{31}{62}$	44.64 $31.11$	-10.71 $35.42$
$ring_{-}7_{-}3$ $ring_{-}7_{-}3$	wstate	168	90 26	$0 \\ 0$	9	66	nan	-055.55 -1000	90 26	90 44	43	-65.38	$\frac{33.42}{2.27}$
$ring_{-7}$ 3	vqe qaoa	190	$\frac{20}{34}$	81	6	75	nan 7.41	-1150	158	42	56	64.56	-33.33
ring_7_3	qft	270	78	540	108	159	70.56	-47.22	319	191	116	63.64	39.27
ring_7_3	qftentangled	282	82	540	138	nan	nan	nan	323	239	nan	nan	nan
ring_7_3	realamprandom	335	57	1299	342	435	66.51	-27.19	799	338	167	79.1	50.59
$ring_7_3$	twolocalrandom	335	57	1299	330	435	66.51	-31.82	799	365	167	79.1	54.25
$ring_{-}7_{-}3$	su2random	375	61	1299	345	435	66.51	-26.09	827	344	172	79.2	50
$ring_7_3$	qnn	459	108	816	240	nan	nan	nan	597	343	nan	nan	nan
$ring_{-}7_{-}3$	portfolioqaoa	615	132	1299	348	nan	nan	nan	925	482	nan	nan	nan
$ring_{-}7_{-}3$	$\operatorname{random}$	646	155	417	213	nan	nan	nan	555	369	nan	nan	nan
$ring_7_3$	portfoliovqe	1145	217	1299	360	nan	nan	nan	947	600	nan	nan	nan
full_5_4	ghz	12	12	0	0	6	nan	nan	12	12	14	-16.67	-16.67
full_5_4	dj	79	17	36	12	3	91.67	75	56	40	20	64.29	50
full_5_4	graphstate	100	22	24	9	12	50	-33.33	50	25	25	50	0
full_5_4	wstate	163	90	0	0	9	nan	nan	90	90	68	24.44	24.44
full_5_4	vqe	168	26 34	0	0	$\frac{12}{24}$	nan	nan	26	26 53	31 43	-19.23	-19.23
$\frac{1}{5}4$ $\frac{5}{4}$	qaoa qft	190 270	54 78	63 198	6 60	90	$61.9 \\ 54.55$	-300 -50	150 280	55 160	$\frac{43}{117}$	71.33 $58.21$	18.87 $26.88$
full_5_4	qftentangled	282	82	198	63	102	48.48	-61.9	$\frac{280}{284}$	190	114	59.86	40
full_5_4 full_5_4	realamprandom	335	57	531	192	180	66.1	6.25	644	$\frac{190}{260}$	$114 \\ 137$	59.80 78.73	$40 \\ 47.31$
full_5_4	twolocalrandom	335	57	531	$\frac{192}{240}$	180	66.1	$\frac{0.25}{25}$	644	$\frac{200}{277}$	$137 \\ 137$	78.73	50.54
full_5_4	su2random	375	61	531	270	180	66.1	33.33	663	378	142	78.58	62.43
full_5_4	qnn	459	108	345	156	144	58.26	7.69	513	328	159	69.01	51.52
full_5_4	portfolioqaoa	612	132	531	237	297	44.07	-25.32	781	432	239	69.4	44.68
full_5_4	random	646	155	225	132	228	-1.33	-72.73	512	293	198	61.33	32.42
$full_{-}5_{-}4$	portfoliovqe	1145	217	531	246	240	54.8	2.44	818	671	279	65.89	58.42
$grid_{-}6_{-}4$	$\operatorname{ghz}$	12	12	9	12	18	-100	-50	21	18	18	14.29	0
grid64	$\mathrm{d}\mathrm{j}$	79	17	108	15	12	88.89	20	79	37	25	68.35	32.43

Table 2: Additional swap gates and circuit depth,  $n=10\,$ 

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
grid_6_4	graphstate	100	22	51	9	54	-5.88	-500	71	25	25	64.79	0
$grid_6_4$	wstate	163	90	12	3	15	-25	-400	99	93	65	34.34	30.11
$grid_{-}6_{-}4$	vqe	168	26	54	3	21	61.11	-600	60	26	31	48.33	-19.23
$grid_{-}6_{-}4$	qaoa	190	34	96	18	33	65.62	-83.33	188	53	42	77.66	20.75
grid_6_4	qft	270	78	408	93	183	55.15	-96.77	318	189	119	62.58	37.04
grid_6_4	qftentangled	282	82	393	111	201	48.85	-81.08	314	189	138	56.05	26.98
grid_6_4	realamprandom	335	57	828	282	249	69.93	11.7	669	294	120	82.06	59.18
grid_6_4	twolocalrandom	335	57	828	222	249	69.93	-12.16	669	217	120	82.06	44.7
$ grid_{-}6_{-}4 $ $ grid_{-}6_{-}4 $	su2random	$375 \\ 459$	61 108	828 618	243 186	249 288	69.93 $53.4$	-2.47 -54.84	$690 \\ 594$	269 301	123 181	82.17 $69.53$	54.28 $39.87$
grid_6_4 grid_6_4	qnn portfolioqaoa	612	132	828	$\frac{160}{225}$	450	45.65	-34.64 -100	816	341	$\frac{101}{273}$	66.54	39.87 19.94
grid_6_4	random	646	152	327	162	306	6.42	-88.89	492	324	208	57.72	35.8
grid_6_4	portfoliovge	1145	217	828	219	291	64.86	-32.88	890	496	251	71.8	49.4
$ring_5_4$	ghz	12	12	0	9	45	nan	-400	12	15	$25^{-5}$	-108.33	-66.67
$ring_{-}5_{-}4$	$\stackrel{\circ}{\mathrm{d}\mathrm{j}}$	79	17	60	18	18	70	0	69	37	23	66.67	37.84
$ring_5_4$	graphstate	100	22	45	18	33	26.67	-83.33	59	27	24	59.32	11.11
$ring_5_4$	wstate	163	90	0	3	45	nan	-1400	90	93	60	33.33	35.48
$ring_5_4$	vqe	168	26	0	3	51	nan	-1600	26	35	35	-34.62	0
$ring_5_4$	qaoa	190	34	117	15	69	41.03	-360	191	50	60	68.59	-20
$ring_5_4$	qft	270	78	336	123	nan	nan	nan	258	172	nan	nan	nan
$ring_5_4$	qftentangled	282	82	336	144	195	41.96	-35.42	262	214	137	47.71	35.98
ring_5_4	realamprandom	335	57	852	318	nan	nan	nan	624	327	nan	nan	nan
ring_5_4	twolocalrandom	335	57	852	351	nan	nan	nan	624	343	nan	nan	nan
ring_5_4	su2random	$375 \\ 459$	61 108	$852 \\ 603$	$\frac{339}{255}$	nan	nan	nan	$646 \\ 538$	$\frac{346}{312}$	nan	nan	nan
ring_5_4 ring_5_4	qnn portfolioqaoa	612	108 $132$	852	$\frac{255}{321}$	nan nan	nan nan	nan	558 796	$\frac{312}{476}$	nan nan	nan	nan
ring_5_4 ring_5_4	random	646	152 $155$	$\frac{378}{378}$	$\frac{321}{237}$	nan	nan	nan nan	547	409	nan	nan nan	nan nan
ring_5_4	portfoliovqe	1145	217	852	$\frac{237}{387}$	nan	nan	nan	894	574	nan	nan	nan
t_horizontal_5_4	ghz	12	12	18	9	18	0	-100	30	18	17	43.33	5.56
$t_{horizontal_5_4}$	dj	79	17	150	21	15	90	28.57	88	47	26	70.45	44.68
$t_{horizontal_5_4}$	graphstate	100	22	54	18	54	0	-200	53	29	32	39.62	-10.34
$t_{-}horizontal_{-}5_{-}4$	wstate	163	90	45	0	24	46.67	nan	116	90	78	32.76	13.33
$t_{horizontal_5_4}$	vqe	168	26	51	3	30	41.18	-900	71	35	37	47.89	-5.71
$t_{-horizontal_5_4}$	qaoa	190	34	129	24	114	11.63	-375	206	53	64	68.93	-20.75
t_horizontal_5_4	qft	270	78	486	162	195	59.88	-20.37	331	177	106	67.98	40.11
t_horizontal_5_4	qftentangled	282	82	510	150	195	61.76	-30	313	185	110	64.86	40.54
t_horizontal_5_4	realamprandom	335	57	1614	366	414	74.35	-13.11	840	270	143	82.98	47.04
t_horizontal_5_4	twolocalrandom	335	57	1614	360	414	74.35	-15	840	268	143	82.98	46.64
t_horizontal_5_4 t_horizontal_5_4	su2random	$375 \\ 459$	61 108	$1614 \\ 1056$	$\frac{381}{264}$	$414 \\ 402$	74.35 $61.93$	-8.66 -52.27	$868 \\ 662$	271 288	147 $194$	83.06 $70.69$	$45.76 \\ 32.64$
t_horizontal_5_4	qnn portfolioqaoa	615	132	1614	$\frac{204}{360}$	402	69.7	-32.27 -35.83	979	380	$\frac{194}{238}$	75.69	37.37
t_horizontal_5_4	random	646	$152 \\ 155$	522	279	402	22.99	-33.83 -44.09	660	345	$\frac{230}{231}$	65	33.04
t_horizontal_5_4	portfoliovqe	1145	217	1614	372	441	72.68	-18.55	1001	424	$\frac{231}{276}$	72.43	34.91
t_vertical_5_4	ghz	12	12	27	6	30	-11.11	-400	39	18	19	51.28	-5.56
$t_{vertical_5_4}$	$\mathrm{d}\mathrm{j}$	79	17	135	18	15	88.89	16.67	85	51	25	70.59	50.98
$t_{vertical_5_4}$	graphstate	100	22	57	15	48	15.79	-220	59	26	29	50.85	-11.54
$t_{vertical_5_4}$	wstate	163	90	72	3	45	37.5	-1400	137	93	66	51.82	29.03
$t_{vertical_5_4}$	vqe	168	26	66	0	51	22.73	nan	73	26	38	47.95	-46.15
$t_{vertical_5_4}$	qaoa	190	34	114	21	111	2.63	-428.57	196	53	60	69.39	-13.21
$t_{vertical_5_4}$	qft	270	78	498	138	195	60.84	-41.3	273	195	106	61.17	45.64
$t_{\text{vertical}}_{-5}_{-4}$	qftentangled	282	82	510	150	195	61.76	-30	309	198	110	64.4	44.44
$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	realamprandom	335	57	1515	378	447	70.5	-18.25	835	304	154	81.56	49.34
t_vertical_5_4	twolocalrandom	335	57	1515	384	447	70.5	-16.41	835	287	154	81.56	46.34
t_vertical_5_4	su2random	375 450	61	1515	429	447	70.5	-4.2	863	374	160	81.46	57.22
t_vertical_5_4	qnn	459 615	108	1002	249	423	57.78	-69.88	662	258	204	69.18	20.93
t_vertical_5_4 t_vertical_5_4	portfolioqaoa random	$615 \\ 646$	$\frac{132}{155}$	$1515 \\ 525$	$\frac{354}{270}$	504 381	66.73 $27.43$	-42.37 -41.11	$976 \\ 710$	$394 \\ 344$	$\frac{255}{228}$	73.87 $67.89$	$35.28 \\ 33.72$
t_vertical_5_4 t_vertical_5_4	random portfoliovqe	$\frac{646}{1145}$	$\frac{155}{217}$	$\frac{525}{1515}$	366	$\frac{381}{507}$	66.53	-41.11 -38.52	997	508	228 282	67.89 71.72	33.72 44.49
line_1_20	ghz	1143 $12$	$\frac{217}{12}$	1919	30	27	nan	-36.52 10	12	36	262 15	-25	58.33
line_1_20	dj	79	17	216	27	21	90.28	22.22	94	51	30	68.09	41.18
line_1_20	graphstate	100	22	66	18	42	36.36	-133.33	56	31	29	48.21	6.45
	0r	-50											

Table 2: Additional swap gates and circuit depth,  $n=10\,$ 

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
$line_1_20$	wstate	163	90	0	0	27	nan	nan	90	90	76	15.56	15.56
$line_1_20$	vqe	168	26	0	0	27	nan	nan	26	26	33	-26.92	-26.92
$line_1_20$	qaoa	190	34	168	30	75	55.36	-150	228	53	44	80.7	16.98
$line_1_20$	qft	270	78	780	168	195	75	-16.07	342	184	106	69.01	42.39
$line_1_20$	qftentangled	282	82	780	195	195	75	0	346	214	110	68.21	48.6
$line_1_20$	realamprandom	335	57	2160	372	396	81.67	-6.45	876	272	112	87.21	58.82
$line_1_20$	two local random	335	57	2160	360	396	81.67	-10	876	268	112	87.21	58.21
$line_1_20$	su2random	375	61	2160	360	396	81.67	-10	904	291	116	87.17	60.14
$line_1_20$	qnn	459	108	1440	258	327	77.29	-26.74	657	296	155	76.41	47.64
$line_1_20$	portfolioqaoa	615	132	2160	360	408	81.11	-13.33	985	380	176	82.13	53.68
$line_1_20$	$\operatorname{random}$	646	155	582	312	435	25.26	-39.42	708	404	225	68.22	44.31
$line\_1\_20$	portfoliovqe	1145	217	2160	360	408	81.11	-13.33	1007	402	255	74.68	36.57

Table 3: Additional swap gates and circuit depth,  $n\,=\,15$ 

	layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
Mill 20.1   Graphstate   150   62   03   0   0   0   0   0   0   0   0	full_20_1	ghz	17	17	0	0	0	nan	nan	17	17	17	0	0
Full   Dall   Vege	$full_20_1$	_	118	22	0	0	0	nan	nan	22	22	22	0	0
Mill   Mill	$full_20_1$	graphstate	150	26	0	0	0	nan	nan	26	26	26	0	0
Mill 20.1   QR	$full_20_1$	vqe	253	31	0	0	0	nan	nan	31	31	31	0	0
		wstate			0	0	0	nan	nan				0	0
Mill 20.1   Open					0	0		nan	nan				0	0
Final 20		-						nan	nan					
		•						nan	nan					
Mill 20.1		-						nan	nan					
Mill 20.1														
Full 20.1		*												-
Full.10.2   ghz   portfolioque   2505   327   0   0   0   0   0   0   0   0   0		• •												-
full 10.2         giz         17         7         0         12         0         nan         100         17         23         17         0         20         20         11         22         66         6         6         86.36         -50         95         22         90         49.12         -11.54           full 10.2         westace         253         31         0         6         0         nan         100         313         40         31         0         22.5           full 10.2         qsoa         255         34         63         6         69         -9.52         -105         164         46         26         60,37         24.1         11.1         11.1         11.1         11.1         11.1         11.1         11.1         11.1         11.1         12.1         11.1         11.1         12.1         11.1         12.1         11.1         12.1         11.1         12.1         11.1         12.1         11.1         12.2         11.1         12.2         11.1         12.2         12.1         12.2         12.1         12.2         12.2         12.2         12.2         12.2         13.2         12.2         12.2														-
full.10.2         dj         11.8         22         66         6         9         8.63.6         -50         95         2.7         29         69.47         -7.11.54           full.10.2         cyog         253         3.3         0         6         0         nam         100         3.3         135         0         2.25           full.10.2         qoan         285         34         63         6         9         9.02         -1000         135         138         135         0         2.25           full.10.2         qftentaugled         699         118         378         48         321         15.08         -368.75         485         307         241         50.31         2.25           full.10.2         qftentaugled         695         77         146         168         315         72.51         8-7.5         139         401         21         84.99         45.53           full.10.2         qua         675         77         146         168         315         72.51         8-7.5         139         401         14         86         72         26         8-7.5         139         401         14         86 <th< td=""><td></td><td>•</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		•												
		_											-	
full 10 2         westate         223         31         0         6         0         nan         100         31         40         31         0         22.5           full 10 2         qaoa         285         34         63         6         9         -9.52         -1050         164         62         65         60.37         -4.84           full 10 2         qftentaagled         681         122         378         72         321         15.08         -568.75         485         307         241         50.31         21.5           full 10 2         qeralamprandom         615         77         1146         168         315         72.51         87.5         1399         401         210         84.99         47.63           full 10.2         qmn         914         158         720         69         369         48.75         434.78         1103         430         202         212         94.99         47.63           full 10.2         qmn         914         158         720         192         414         180         30         66.7         227.5         176         47         35         49.88           full 10.2 <th< td=""><td></td><td>*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>		*												
full.10.2         wstate         23         135         0         6         0         nan         100         135         135         0         2.17           full.10.2         qfa         581         118         378         48         321         15.08         -568.75         483         307         241         50.31         21.5           full.10.2         qftentangled         608         122         378         72         321         15.08         -348.83         489         329         245         49.99         25.53           full.10.2         tendeamprandom         675         81         1146         168         315         72.51         87.5         1399         401         21         84.99         46.84           full.10.2         qnn         91         158         720         69         360         48.75         -43.78         130         430         30         72.62         29.75           full.10.2         qnn         914         158         720         69         360         48.75         -43.78         130         40         22.5         54.83           full.10.2         portfolioqaoa         250         327		~ -												
full_10_2         qaoa         285         34         63         69         9-52         -105         164         62         65         67.37         -4.84           full_10_2         qftentangled         608         122         378         72         321         15.08         -34.58         348         329         245         59.99         25.53           full_10_2         twolocalrandom         615         77         1146         168         315         72.51         87.5         1399         401         210         84.99         47.63           full_10_2         twolocalrandom         615         77         1146         168         315         72.51         87.5         1393         392         210         84.99         46.84           full_10_2         qum         914         158         720         69         397         1146         120         393         65.71         -227.5         1766         747         351         80.12         33.1           full_10_2         portfolioqaa         126         192         1146         120         393         65.71         -227.5         1766         747         351         80.12         33.1         4														
full_10_2         qft         591         118         378         48         321         15.08         -345.83         489         329         241         50.31         21.5           full_10_2         qtealamprandom         615         77         1146         168         315         72.51         -87.5         1399         401         210         84.99         47.63           full_10_2         su2random         675         81         1146         168         315         72.51         -87.5         1399         305         210         84.99         46.84           full_10_2         su2random         675         81         1146         186         315         72.51         -69.35         143         329         215         85         49.89           full_10_2         optofolioqaoa         120         1146         180         369         48.75         -244.78         110         30         55.92         44.32           full_10_2         portfolioqaoa         120         41         61         31         80         66.77         71.8         93         66.71         121         90         66.27         72.2         120         90         52.9 <th< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></th<>														
full.10.2         qfnentangled         608         122         378         72         321         15.08         -34.53         489         329         245         49.99         25.53           full.10.2         realamprandom         615         77         1146         168         315         72.51         -87.5         1399         395         210         84.99         46.84           full.10.2         qun         914         158         77.0         69         35.7         -21.51         -87.5         1393         392         210         84.99         46.84           full.10.2         qun         914         158         720         69         369         48.75         -434.78         110         33         30         26.7         -427.5         176         77         351         80.12         33.0         101         102         70         70         20         55.2         55.20         43.0         101         114         114         129         30         66.67         -133.3         35         23         25         28.7         -8.7         37         36         34         178         178         18         148         9.2         18         <														
full.10.2         realamprandom         615         77         1146         168         315         72.51         -87.5         1399         401         210         84.99         47.63           full.10.2         su2random         675         81         1146         168         315         72.51         -69.35         1433         429         210         84.98           full.10.2         qun         914         158         720         69         369         48.75         -434.78         1103         302         72.62         29.77           full.10.2         portfolioqea         1260         192         1146         120         333         65.71         -227.5         676         747         351         80.12         53.01         53.01         140         120         90         -66.67         748.12         190         1904         504         53.22         53.93         43.2		-												
full.10.2         twoloealrandom         615         77         1146         168         315         72.51         -87.55         1399         395         210         84.98         48.88           full.10.2         qnn         914         158         720         69         369         48.75         -434.78         1103         430         302         72.62         29.77           full.10.2         portfolioqoa         1260         192         1146         120         393         68.71         -227.5         176         747         351         80.12         53.03           full.10.2         portfolioqoa         2505         327         1146         129         597         -11.8         -136.9         1200         950         529         55.22         43.33           full.10.2         portfolioqoa         250         324         18.81         18.9         30         -66.67         -233.33         35         223         25         25.7         -8.7           grid.9.2         graphstate         150         26         75         15         60         20         300         70         29         33         52.86         -13.79           grid.9.2		•												
full.10.2         su2random         675         81         1.146         186         315         72.51         -69.35         1.133         429         21         85         49.88           full.10.2         oportfolioqaoa         1960         1920         149         330         65.71         -227.55         1766         747         351         80.12         53.01           full.10.1         random         1992         412         534         252         597         -11.8         -136.9         1200         950         529         55.92         44.32           full.10.2         portfoliovqe         2505         327         1146         192         534         534         -178.12         190         500         500         500         500         500         700         700         70         73.52         52.57         -8.7         83         93         66.67         233.33         35         23         25         25.57         -8.7         93         66.66         20         300         300         70         29         33         52.86         -13.79         93         93         52.59         73.70         35         52.7         15.7         14														
full_10_2         qnn         914         158         720         69         369         48.75         -434.78         1103         430         302         72.62         29.77           full_10_2         portfolioqaoa         1992         412         534         252         597         -11.8         -13.69         1200         505         529         55.92         43.32           full_10_2         portfoliovqe         2505         327         1146         192         534         -178.12         1903         1094         504         73.52         53.33           grid_9_2         ghz         117         17         18         9         30         -66.67         -233.33         35         52         28.57         -8.77           grid_9_2         dpa         graphstate         150         26         75         15         60         20         -300         70         29         33         52.86         13.79           grid_9_2         vqe         223         13         48         24         60         -25         -15.29         683.33         247         48         60         75.71         -25           grid_9_2         qftentangled														
full.10.2         random         1992         412         534         252         597         -11.8         -136.9         120         950         529         55.92         44.32           full.10.2         portfoliovqe         2505         327         114         18         9         30         -66.67         -233.33         35         23         25         25.57         -8.7           grid.9.2         dj         118         22         234         27         24         89.74         11.11         122         50         32         25.285         -8.7           grid.9.2         vge         253         31         48         24         60         20         -30.0         70         29         33         52.86         -13.79           grid.9.2         wstate         253         135         57         15         48         15.79         -20         156         144         96         38.46         33.33           grid.9.2         qft         591         118         1248         255         366         82.27         -45.29         679         346         200         75.71         -25           grid.9.2         qft         591 </td <td><math>full_10_2</math></td> <td></td> <td>914</td> <td>158</td> <td>720</td> <td>69</td> <td>369</td> <td></td> <td>-434.78</td> <td></td> <td>430</td> <td>302</td> <td></td> <td></td>	$full_10_2$		914	158	720	69	369		-434.78		430	302		
full.10.2         portfoliovqe         2505         327         1146         192         534         53.4         -178.12         1903         1094         504         73.52         53.93           grid.9.2         ghz         117         17         18         9         30         -66.67         -233.33         35         23         25         28.57         -8.7           grid.9.2         graphstate         150         26         75         15         60         20         -300         70         29         33         52.86         -13.79           grid.9.2         wstate         253         315         557         15         48         15.79         -220         156         60         45         50         16.67         -11.11           grid.9.2         qaoa         285         34         198         18         141         28.79         -68.33         247         48         60         75.71         -25           grid.9.2         qftentangled         608         122         1118         1248         255         367         68.27         -55.29         679         346         200         70.754         42.22           grid.9.2 <td><math>full_10_2</math></td> <td>portfolioqaoa</td> <td>1260</td> <td>192</td> <td>1146</td> <td>120</td> <td>393</td> <td>65.71</td> <td>-227.5</td> <td>1766</td> <td>747</td> <td>351</td> <td>80.12</td> <td>53.01</td>	$full_10_2$	portfolioqaoa	1260	192	1146	120	393	65.71	-227.5	1766	747	351	80.12	53.01
grid-9.2         ghz         17         17         18         9         30         -66.67         -233.33         35         23         25         28.77         -8.7           grid-9.2         dj         118         22         234         27         24         89.74         11.11         122         50         32         73.77         36           grid-9.2         vqe         253         31         48         24         60         -25         -150         60         45         50         16.67         -11.11           grid-9.2         vqe         253         135         57         15         48         15.0         220         156         144         96         38.46         33.33           grid-9.2         qfa         591         118         1248         255         396         68.27         -65.29         679         346         600         75.71         25           grid-9.2         qftentangled         608         122         1113         255         376         67.92         -40         610         357         192         68.22         grid-9.2         grid-9.2         qftentangled         608         122         1131	$full_10_2$	random	1992	412	534	252	597	-11.8	-136.9	1200	950	529	55.92	44.32
griid.9.2         dj         118         22         234         27         24         89.74         11.11         122         50         32         73.77         36         grid.9.2         graphstate         150         26         75         15         60         20         -300         70         29         33         52.86         -13.79         grid.9.2         vyce         253         135         57         15         48         15.79         -20         156         144         96         38.46         33.33         33.33         grid.9.2         qt         48         18         141         28.79         -683.33         247         48         60         75.71         -25         grid.9.2         qftentangled         608         122         113         255         357         67.92         -40         610         357         192         68.52         46.22         grid.9.2         qftentangled         608         122         113         255         357         67.92         -40         610         357         192         68.52         46.22         grid.9.2         qftentangled         608         122         141         25.5         367         67.92         -30.65 <t< td=""><td><math>full_10_2</math></td><td>portfoliovqe</td><td>2505</td><td>327</td><td>1146</td><td>192</td><td>534</td><td>53.4</td><td>-178.12</td><td>1903</td><td>1094</td><td>504</td><td>73.52</td><td>53.93</td></t<>	$full_10_2$	portfoliovqe	2505	327	1146	192	534	53.4	-178.12	1903	1094	504	73.52	53.93
grid.9.2         graphstate         150         26         75         15         60         20         -300         70         29         33         52.86         -13.79           grid.9.2         vqe         253         31         48         24         60         -25         -150         60         45         50         16.67         -11.11           grid.9.2         qaoa         285         34         198         18         141         28.79         -683.33         247         48         60         75.71         -25           grid.9.2         qft         591         118         1248         255         396         68.27         -55.29         679         346         200         70.54         42.2           grid.9.2         qftentangled         608         122         1113         255         357         67.92         -40         610         357         192         68.52         45.23         44.22           grid.9.2         qftentangled         608         122         113         35.33         667         85         71.81         -30.14         165         508         249         89.93         50.98           grid.9.2	$grid_9_2$	$\operatorname{ghz}$	17	17	18	9	30	-66.67	-233.33	35	23	25	28.57	-8.7
grid.9.2         vqe         253         31         48         24         60         -25         -150         60         45         50         16.67         -11.11           grid.9.2         wstate         253         135         57         115         48         15.79         -220         156         144         96         38.46         33.33           grid.9.2         qft         591         118         1248         255         396         68.27         -55.29         679         346         200         70.54         42.2           grid.9.2         qftentangled         608         122         1113         255         357         67.92         -40         610         357         192         68.52         46.22           grid.9.2         realamprandom         615         77         3033         669         834         72.5         -33.65         1625         431         240         85.23         44.32           grid.9.2         twolocalrandom         675         81         3033         657         855         71.81         -30.14         1659         508         249         84.99         50.98           grid.9.2         qnn         <	$grid_9_2$	dj	118	22	234	27	24	89.74	11.11	122	50	32	73.77	36
grid 9.2         wstate         253         135         57         15         48         15.79         -220         156         144         96         38.46         33.33           grid 9.2         qaoa         285         34         198         118         124         28.79         -683.33         247         48         60         75.71         -25           grid 9.2         qftentangled         608         122         1113         255         357         67.92         -40         610         357         192         68.52         46.22           grid 9.2         realamprandom         615         77         3033         609         834         72.5         -36.95         1625         431         240         85.23         47.02           grid 9.2         twolocalrandom         615         77         3033         609         834         72.5         -36.95         1625         431         240         85.23         47.02           grid 9.2         qun         914         158         2064         438         726         64.83         -65.75         1266         486         328         499         50.98           grid 9.2         portfolioqaoa	-	graphstate					60		-300	70		33		-13.79
grid.9.2         qaoa         285         34         198         18         141         28.79         -683.33         247         48         60         75.71         -25           grid.9.2         qftentangled         608         122         1118         1248         255         396         68.27         -55.29         679         346         200         75.74         42.2           grid.9.2         qftentangled         608         122         1113         255         357         67.92         -40         610         357         192         68.52         46.22           grid.9.2         twolocalrandom         615         77         3033         609         834         72.5         -36.95         1625         453         240         85.23         44.02           grid.9.2         qmn         675         81         3033         657         855         71.81         -30.14         1659         508         249         84.99         50.98           grid.9.2         qmn         914         158         2064         438         726         64.83         -65.75         1266         483         324         74.99         32.251           grid.9.2 <td>0</td> <td></td>	0													
grid_9_2         qft         591         118         1248         255         396         68.27         -55.29         679         346         200         70.54         42.2           grid_9_2         qftentangled         608         122         1113         255         357         67.92         -40         610         357         192         68.52         46.22           grid_9_2         realamprandom         615         77         3033         624         834         72.5         -36.65         1625         453         240         85.23         47.02           grid_9_2         twolocalrandom         615         77         3033         669         834         72.5         -36.95         1625         431         240         85.23         44.02           grid_9_2         su2random         615         77         3033         667         855         71.81         -30.14         1669         508         249         84.99         50.98           grid_9_2         qnn         914         158         2064         438         72.6         64.83         -65.75         1266         486         328         74.09         32.3           grid_9_2 <t< td=""><td>9</td><td>wstate</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>	9	wstate												
grid.9.2         qftentangled         608         122         1113         255         357         67.92         -40         610         357         192         68.52         46.22           grid.9.2         realamprandom         615         77         3033         624         834         72.5         -33.65         1625         453         240         85.23         47.02           grid.9.2         twolocalrandom         615         77         3033         657         855         71.81         -30.14         1659         508         249         84.99         50.98           grid.9.2         qnn         914         158         2064         438         726         64.83         -65.75         1266         486         328         74.09         32.51           grid.9.2         portfolioqaoa         1260         192         3033         597         1077         64.49         -80.4         1849         633         416         77.5         34.28           grid.9.2         portfolioqaoa         1260         192         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98           ring.	-													
grid.9.2         realamprandom         615         77         3033         624         834         72.5         -33.65         1625         453         240         85.23         47.02           grid.9.2         twolocalrandom         615         77         3033         609         834         72.5         -36.95         1625         431         240         85.23         44.32           grid.9.2         gurl.         675         81         3033         657         855         71.81         -30.14         1659         508         249         84.99         50.98           grid.9.2         qnn         914         158         2064         438         726         64.83         -65.75         1266         486         328         74.09         32.51           grid.9.2         portfolioqaoa         1260         192         3033         597         1077         64.49         -80.4         1849         633         416         77.5         34.28           grid.9.2         portfolioqao         150         26         60         21         114         nan         -442.86         17         32         37         -117.65         -15.62           ring.10.2	~	_												
grid.9.2         twolocalrandom         615         77         3033         609         834         72.5         -36.95         1625         431         240         85.23         44.32           grid.9.2         su2random         675         81         3033         657         855         71.81         -30.14         1659         508         249         84.99         50.98           grid.9.2         qnn         914         158         2064         438         726         64.83         -65.75         1266         486         328         74.09         32.51           grid.9.2         portfolioqaoa         1260         192         3033         597         1077         64.49         -80.4         1849         633         416         77.5         34.28           grid.9.2         random         1992         412         1680         762         1125         33.04         -47.64         1845         1041         583         68.4         44           grid.9.2         gpa         portfoliovqe         2505         327         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98	-	1 0												
grid.9-2         su2random         675         81         3033         657         855         71.81         -30.14         1659         508         249         84.99         50.98           grid.9-2         qnn         914         158         2064         438         726         64.83         -65.75         1266         486         328         74.09         32.51           grid.9-2         portfolioqaoa         1260         192         3033         597         1077         64.49         -80.4         1849         633         416         77.5         34.28           grid.9-2         portfoliovqe         2505         327         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98           grid.9-2         portfoliovqe         2505         327         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98           grid.9-2         gbz         portfoliovqe         250         327         3033         651         1107         63.5         -70.05         2088         798         471         77.74         40.98      <	0	-												
grid.9.2         qnn         914         158         2064         438         726         64.83         -65.75         1266         486         328         74.09         32.51           grid.9.2         portfolioqaoa         1260         192         3033         597         1077         64.49         -80.4         1849         633         416         77.5         34.28           grid.9.2         portfoliovqe         2505         327         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98           ring.10.2         ghz         17         17         0         21         114         nan         -442.86         17         32         37         -117.65         -15.62           ring.10.2         ghz         118         22         336         45         63         81.25         -40         122         69         25         79.51         63.77           ring.10.2         graphstate         150         26         60         21         93         -55         -342.86         71         31         37         47.89         -19.35           ring.10.2         wstate	~													
grid_9_2         portfolioqaoa         1260         192         3033         597         1077         64.49         -80.4         1849         633         416         77.5         34.28           grid_9_2         random         1992         412         1680         762         1125         33.04         -47.64         1845         1041         583         68.4         44           grid_9_2         portfoliovqe         2505         327         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98           ring_10_2         ghz         17         17         0         21         114         nan         -442.86         17         32         37         -117.65         -15.62           ring_10_2         graphstate         150         26         60         21         93         -55         -342.86         71         31         37         47.89         -19.35           ring_10_2         graphstate         150         26         60         21         93         -55         -342.86         71         31         37         47.89         -19.35           ring_10_2         wstate <td>~</td> <td></td>	~													
grid.9.2         random         1992         412         1680         762         1125         33.04         -47.64         1845         1041         583         68.4         44           grid.9.2         portfoliovqe         2505         327         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98           ring.10.2         ghz         17         17         0         21         114         nan         -442.86         17         32         37         -117.65         -15.62           ring.10.2         dj         118         22         336         45         63         81.25         -40         122         69         25         79.51         63.77           ring.10.2         graphstate         150         26         60         21         93         -55         -342.86         71         31         37         47.89         -19.35           ring.10.2         vqe         253         31         0         15         144         nan         -860         31         48         51         -64.52         -6.25           ring.10.2         qaoa         285	~	_												
grid_9_2         portfoliovqe         2505         327         3033         651         1107         63.5         -70.05         2088         798         471         77.44         40.98           ring_10_2         ghz         17         17         0         21         114         nan         -442.86         17         32         37         -117.65         -15.62           ring_10_2         dj         118         22         336         45         63         81.25         -40         122         69         25         79.51         63.77           ring_10_2         graphstate         150         26         60         21         93         -55         -342.86         71         31         37         47.89         -19.35           ring_10_2         vqe         253         31         0         15         144         nan         -860         31         48         51         -64.52         -6.25           ring_10_2         qaoa         285         34         291         51         141         51.55         -176.47         303         65         60         80.2         7.69           ring_10_2         qft         591         118<	-	• •												
ring_10_2         ghz         17         17         0         21         114         nan         -442.86         17         32         37         -117.65         -15.62           ring_10_2         dj         118         22         336         45         63         81.25         -40         122         69         25         79.51         63.77           ring_10_2         graphstate         150         26         60         21         93         -55         -342.86         71         31         37         47.89         -19.35           ring_10_2         vqe         253         31         0         15         144         nan         -860         31         48         51         -64.52         -6.25           ring_10_2         wstate         253         135         0         42         156         nan         -271.43         135         153         90         33.33         41.18           ring_10_2         qaoa         285         34         291         51         141         51.55         -176.47         303         65         60         80.2         7.69           ring_10_2         qft         591         118	~													
ring_10_2         dj         118         22         336         45         63         81_25         -40         122         69         25         79_51         63.77           ring_10_2         graphstate         150         26         60         21         93         -55         -342_86         71         31         37         47_89         -19_35           ring_10_2         vqe         253         31         0         15         144         nan         -860         31         48         51         -64_52         -6.25           ring_10_2         wstate         253         135         0         42         156         nan         -271_43         135         153         90         33.33         41_18           ring_10_2         qaoa         285         34         291         51         141         51_55         -176_47         303         65         60         80.2         7.69           ring_10_2         qft         591         118         2034         384         504         75_22         -31_25         707         358         186         73_69         48_04           ring_10_2         qftentangled         608         1	~	•												
ring_10_2         graphstate         150         26         60         21         93         -55         -342.86         71         31         37         47.89         -19.35           ring_10_2         vqe         253         31         0         15         144         nan         -860         31         48         51         -64.52         -6.25           ring_10_2         wstate         253         135         0         42         156         nan         -271.43         135         153         90         33.33         41.18           ring_10_2         qaoa         285         34         291         51         141         51.55         -176.47         303         65         60         80.2         7.69           ring_10_2         qft         591         118         2034         384         504         75.22         -31.25         707         358         186         73.69         48.04           ring_10_2         qftentangled         608         122         2034         387         627         69.17         -62.02         711         445         216         69.62         51.46           ring_10_2         realamprandom         61	~	_												
ring_10_2         vqe         253         31         0         15         144         nan         -860         31         48         51         -64.52         -6.25           ring_10_2         wstate         253         135         0         42         156         nan         -271.43         135         153         90         33.33         41.18           ring_10_2         qaoa         285         34         291         51         141         51.55         -176.47         303         65         60         80.2         7.69           ring_10_2         qft         591         118         2034         384         504         75.22         -31.25         707         358         186         73.69         48.04           ring_10_2         qftentangled         608         122         2034         387         627         69.17         -62.02         711         445         216         69.62         51.46           ring_10_2         realamprandom         615         77         5427         1116         1332         75.46         -19.35         1879         568         302         83.93         45.59           ring_10_2         su2random	~													
ring_10_2         wstate         253         135         0         42         156         nan         -271.43         135         153         90         33.33         41.18           ring_10_2         qaoa         285         34         291         51         141         51.55         -176.47         303         65         60         80.2         7.69           ring_10_2         qft         591         118         2034         384         504         75.22         -31.25         707         358         186         73.69         48.04           ring_10_2         qftentangled         608         122         2034         387         627         69.17         -62.02         711         445         216         69.62         51.46           ring_10_2         realamprandom         615         77         5427         1116         1332         75.46         -19.35         1879         568         302         83.93         46.83           ring_10_2         twolocalrandom         615         77         5427         1056         1332         75.46         -26.14         1879         555         302         83.93         45.59           ring_10_2	~													
ring_10_2         qaoa         285         34         291         51         141         51.55         -176.47         303         65         60         80.2         7.69           ring_10_2         qft         591         118         2034         384         504         75.22         -31.25         707         358         186         73.69         48.04           ring_10_2         qftentangled         608         122         2034         387         627         69.17         -62.02         711         445         216         69.62         51.46           ring_10_2         realamprandom         615         77         5427         1116         1332         75.46         -19.35         1879         568         302         83.93         46.83           ring_10_2         twolocalrandom         615         77         5427         1056         1332         75.46         -26.14         1879         555         302         83.93         45.59           ring_10_2         su2random         675         81         5427         1074         1338         75.35         -24.58         1922         596         305         84.13         48.83           ring_10_2 <td>~</td> <td></td>	~													
ring_10_2         qft         591         118         2034         384         504         75.22         -31.25         707         358         186         73.69         48.04           ring_10_2         qftentangled         608         122         2034         387         627         69.17         -62.02         711         445         216         69.62         51.46           ring_10_2         realamprandom         615         77         5427         1116         1332         75.46         -19.35         1879         568         302         83.93         46.83           ring_10_2         twolocalrandom         615         77         5427         1056         1332         75.46         -26.14         1879         555         302         83.93         45.59           ring_10_2         su2random         675         81         5427         1074         1338         75.35         -24.58         1922         596         305         84.13         48.83           ring_10_2         qnn         914         158         3576         684         1122         68.62         -64.04         1356         549         351         74.12         36.07           ring_	~													
ring_10_2         qftentangled         608         122         2034         387         627         69.17         -62.02         711         445         216         69.62         51.46           ring_10_2         realamprandom         615         77         5427         1116         1332         75.46         -19.35         1879         568         302         83.93         46.83           ring_10_2         twolocalrandom         615         77         5427         1056         1332         75.46         -26.14         1879         555         302         83.93         45.59           ring_10_2         su2random         675         81         5427         1074         1338         75.35         -24.58         1922         596         305         84.13         48.83           ring_10_2         qnn         914         158         3576         684         1122         68.62         -64.04         1356         549         351         74.12         36.07           ring_10_2         portfolioqaoa         1260         192         5427         996         1701         68.66         -70.78         2060         678         534         74.08         21.24	~													
ring_10_2         realamprandom         615         77         5427         1116         1332         75.46         -19.35         1879         568         302         83.93         46.83           ring_10_2         twolocalrandom         615         77         5427         1056         1332         75.46         -26.14         1879         555         302         83.93         45.59           ring_10_2         su2random         675         81         5427         1074         1338         75.35         -24.58         1922         596         305         84.13         48.83           ring_10_2         qnn         914         158         3576         684         1122         68.62         -64.04         1356         549         351         74.12         36.07           ring_10_2         portfolioqaoa         1260         192         5427         996         1701         68.66         -70.78         2060         678         534         74.08         21.24           ring_10_2         random         1992         412         2127         1050         1407         33.85         -34         2042         1105         580         71.6         47.51           <	~	-												
ring_10_2         twolocalrandom         615         77         5427         1056         1332         75.46         -26.14         1879         555         302         83.93         45.59           ring_10_2         su2random         675         81         5427         1074         1338         75.35         -24.58         1922         596         305         84.13         48.83           ring_10_2         qnn         914         158         3576         684         1122         68.62         -64.04         1356         549         351         74.12         36.07           ring_10_2         portfolioqaoa         1260         192         5427         996         1701         68.66         -70.78         2060         678         534         74.08         21.24           ring_10_2         random         1992         412         2127         1050         1407         33.85         -34         2042         1105         580         71.6         47.51           ring_10_2         portfoliovqe         2505         327         5427         1125         1593         70.65         -41.6         2195         1049         536         75.58         48.9	~													
ring_10_2         su2random         675         81         5427         1074         1338         75.35         -24.58         1922         596         305         84.13         48.83           ring_10_2         qnn         914         158         3576         684         1122         68.62         -64.04         1356         549         351         74.12         36.07           ring_10_2         portfolioqaoa         1260         192         5427         996         1701         68.66         -70.78         2060         678         534         74.08         21.24           ring_10_2         random         1992         412         2127         1050         1407         33.85         -34         2042         1105         580         71.6         47.51           ring_10_2         portfoliovqe         2505         327         5427         1125         1593         70.65         -41.6         2195         1049         536         75.58         48.9	~													
ring_10_2     qnn     914     158     3576     684     1122     68.62     -64.04     1356     549     351     74.12     36.07       ring_10_2     portfolioqaoa     1260     192     5427     996     1701     68.66     -70.78     2060     678     534     74.08     21.24       ring_10_2     random     1992     412     2127     1050     1407     33.85     -34     2042     1105     580     71.6     47.51       ring_10_2     portfoliovqe     2505     327     5427     1125     1593     70.65     -41.6     2195     1049     536     75.58     48.9	~													
ring_10_2     portfolioqaoa     1260     192     5427     996     1701     68.66     -70.78     2060     678     534     74.08     21.24       ring_10_2     random     1992     412     2127     1050     1407     33.85     -34     2042     1105     580     71.6     47.51       ring_10_2     portfoliovqe     2505     327     5427     1125     1593     70.65     -41.6     2195     1049     536     75.58     48.9	~													
ring_10_2 random 1992 412 2127 1050 1407 33.85 -34 2042 1105 580 71.6 47.51 ring_10_2 portfoliovqe 2505 327 5427 1125 1593 70.65 -41.6 2195 1049 536 75.58 48.9	~	_	1260	192	5427	996	1701	68.66	-70.78	2060	678	534	74.08	21.24
	~		1992	412	2127	1050	1407	33.85	-34	2042	1105	580	71.6	47.51
	$\rm ring\_10\_2$	portfoliovqe	2505	327	5427	1125	1593	70.65	-41.6	2195	1049	536	75.58	48.9
	full_7_3	$\operatorname{ghz}$	17	17	0	18	0	nan	100	17	23	17	0	26.09

Table 3: Additional swap gates and circuit depth,  $n\,=\,15$ 

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
full_7_3 full_7_3	$rac{ ext{dj}}{ ext{graphstate}}$	118 150	22 26	96 21	15 9	$\frac{15}{27}$	84.38 -28.57	0 -200	$\begin{array}{c} 116 \\ 44 \end{array}$	41 29	30 31	74.14 $29.55$	26.83 -6.9
full_7_3	vqe	253	31	0	12	0	-28.57 nan	100	31	58	31	0	$\frac{-0.5}{46.55}$
full_7_3	wstate	253	135	0	15	0	nan	100	135	141	135	0	4.26
full_7_3	qaoa	$\frac{285}{285}$	34	108	15	51	52.78	-240	223	56	53	76.23	5.36
$full_7_3$	qft	591	118	501	141	300	40.12	-112.77	588	313	213	63.78	31.95
$full_7_3$	qftentangled	608	122	501	105	300	40.12	-185.71	592	361	217	63.34	39.89
$full_7_3$	realamprandom	615	77	1395	414	nan	nan	nan	1456	456	nan	nan	nan
$full_7_3$	two local random	615	77	1395	438	nan	nan	nan	1456	494	nan	nan	nan
$full_7_3$	su2random	675	81	1395	414	nan	nan	nan	1499	508	nan	nan	nan
$full_7_3$	qnn	914	158	927	282	nan	nan	nan	1170	529	nan	nan	nan
full_7_3	portfolioqaoa	1260	192	1395	318	nan	nan	nan	1787	897	nan	nan	nan
full_7_3	random	1992	412	705	492	nan	nan	nan	1490	1059	nan	nan	nan
full_7_3	portfoliovqe	2505	327	1395	372	0	100	100	2112	837	327	84.52	60.93
grid_8_3	ghz	17	17	15	12	39	-160	-225	32	26	29	9.38	-11.54
grid_8_3	dj	118 150	22 26	261 63	27	21 51	$91.95 \\ 19.05$	22.22 -466.67	125 81	57 26	$\frac{40}{34}$	$68 \\ 58.02$	29.82 -30.77
$\frac{\text{grid}_{8_3}}{\text{grid}_{8_3}}$	graphstate	253	31	66	9	51	19.03 $18.18$	-400.07 -500	80	40	34 45	43.75	-30.77 -12.5
grid_8_3	$egin{array}{c} { m vqe} \\ { m wstate} \end{array}$	$\frac{253}{253}$	135	21	3	39	-85.71	-1200	147	138	99	32.65	28.26
grid_8_3	qaoa	$\frac{285}{285}$	$\frac{133}{34}$	300	33	135	55	-309.09	335	53	58	82.69	-9.43
grid_8_3	qft	591	118	1413	270	405	71.34	-50	697	254	195	72.02	23.23
grid_8_3	qftentangled	608	122	1413	285	537	62	-88.42	709	294	234	67	20.41
grid_8_3	realamprandom	615	77	4404	645	711	83.86	-10.23	1828	446	224	87.75	49.78
grid_8_3	twolocalrandom	615	77	4404	624	711	83.86	-13.94	1828	404	224	87.75	44.55
$grid_8_3$	su2random	675	81	4404	606	711	83.86	-17.33	1869	429	230	87.69	46.39
$grid_8_3$	qnn	914	158	2721	426	813	70.12	-90.85	1368	393	338	75.29	13.99
$grid_8_3$	portfolioqaoa	1260	192	4404	684	1197	72.82	-75	2050	667	430	79.02	35.53
$grid_8_3$	$\operatorname{random}$	1992	412	1962	915	1257	35.93	-37.38	1954	1054	577	70.47	45.26
$grid_8_3$	portfoliovqe	2505	327	4404	720	744	83.11	-3.33	2212	829	429	80.61	48.25
$ring_{-7}$	$\operatorname{ghz}$	17	17	0	39	84	nan	-115.38	17	50	28	-64.71	44
$ring_{-7}$	dj	118	22	168	51	42	75	17.65	116	73	29	75	60.27
$ring_{-7-3}$	graphstate	150	26	54	24	90	-66.67	-275	61	35	36	40.98	-2.86
ring_7_3	$egin{array}{c} { m vqe} \\ { m wstate} \end{array}$	$253 \\ 253$	31 135	0	$\frac{30}{27}$	nan 108	nan	nan -300	$\frac{31}{135}$	70 150	nan 81	nan 40	$     \begin{array}{c}       \text{nan} \\       46   \end{array} $
$\frac{1}{100}$ $\frac{7.3}{100}$	qaoa	$\frac{255}{285}$	$\frac{135}{34}$	228	$\frac{27}{42}$	177	$\begin{array}{c} \text{nan} \\ 22.37 \end{array}$	-300 -321.43	$\frac{133}{267}$	65	71	73.41	-9.23
$ring_7_3$	qft	591	118	1158	333	nan	nan	nan	633	380	nan	nan	nan
ring_7_3	qftentangled	608	122	1158	366	nan	nan	nan	637	407	nan	nan	nan
ring_7_3	realamprandom	615	77	2679	963	1224	54.31	-27.1	1444	612	319	77.91	47.88
ring_7_3	twolocalrandom	615	77	2679	960	1224	54.31	-27.5	1444	686	319	77.91	53.5
$ring_7_3$	su2random	675	81	2679	1020	nan	nan	nan	1487	684	nan	nan	nan
$ring_{-}7_{-}3$	qnn	914	158	1920	633	nan	nan	nan	1233	540	nan	nan	nan
$ring_{-}7_{-}3$	portfolioqaoa	1260	192	2679	882	nan	nan	nan	1862	804	nan	nan	nan
$\operatorname{ring}_{ extsf{-}7}_{ extsf{-}3}$	$\operatorname{random}$	1992	412	1737	924	nan	nan	nan	1888	1242	nan	nan	nan
$ring_7_3$	portfoliovqe	2505	327	2679	987	0	100	100	2156	1067	327	84.83	69.35
$full_5_4$	ghz	17	17	0	18	nan	nan	nan	17	32	nan	nan	nan
full_5_4	dj	118	22	114	27	9	92.11	66.67	101	61	32	68.32	47.54
full_5_4	$\operatorname{graphstate}$	150	30	63	12	36	42.86	-200	73	36	38	47.95	-5.56
full_5_4	vqe	253	31	0	15	nan	nan	nan	31	50	nan	nan	nan
full_5_4	wstate	253	135	0	15	nan	nan	nan	135	141	nan	nan	nan
full_5_4	qaoa	285	34	135	21	63	53.33	-200	242	51 216	55	77.27	-7.84
$\frac{\text{full}_{-5}_{-4}}{\text{full}_{-5}_{-4}}$	qft aftentangled	591 608	118 122	$735 \\ 735$	$\frac{162}{195}$	nan	nan	nan	$638 \\ 642$	$\frac{316}{382}$	nan	nan	nan
full_5_4 full_5_4	qftentangled realamprandom	615	$\frac{122}{77}$	2385	600	nan nan	nan	nan	1683	$\frac{382}{499}$	nan nan	nan nan	nan
full_5_4	twolocalrandom	615	77	2385	579	nan	nan nan	nan nan	1683	$499 \\ 455$	nan	nan	nan nan
full_5_4	su2random	675	81	2385	654	nan	nan	nan	1717	532	nan	nan	nan
full_5_4	qnn	914	158	1548	417	nan	nan	nan	1268	549	nan	nan	nan
full_5_4	portfolioqaoa	1260	192	2385	555	nan	nan	nan	1922	737	nan	nan	nan
full_5_4	random	1992	412	1023	711	nan	nan	nan	1646	1105	nan	nan	nan
full_5_4	portfoliovqe	2505	327	2385	624	nan	nan	nan	2078	1161	nan	nan	nan
$grid_{-}6_{-}4$	ghz	17	17	15	30	39	-160	-30	32	44	29	9.38	34.09
$grid_{-}6_{-}4$	dj	118	22	261	36	21	91.95	41.67	125	77	40	68	48.05

Table 3: Additional swap gates and circuit depth,  $n\,=\,15$ 

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
grid_6_4	graphstate	150	30	87	24	54	37.93	-125	88	34	28	68.18	17.65
grid_6_4	vqe	253	31	66	3	54	18.18	-1700	80	31	45	43.75	-45.16
$grid_{-}6_{-}4$	wstate	253	135	21	21	39	-85.71	-85.71	147	147	99	32.65	32.65
$grid_6_4$	qaoa	285	34	300	48	135	55	-181.25	335	59	58	82.69	1.69
$grid_{-}6_{-}4$	qft	591	118	1584	303	441	72.16	-45.54	709	310	197	72.21	36.45
$grid_6_4$	qftentangled	608	122	1425	297	537	62.32	-80.81	705	288	234	66.81	18.75
$grid_6_4$	realamprandom	615	77	4404	648	711	83.86	-9.72	1828	442	224	87.75	49.32
$grid_6_4$	twolocalrandom	615	77	4404	645	711	83.86	-10.23	1828	395	224	87.75	43.29
$grid_6_4$	su2random	675	81	4404	618	711	83.86	-15.05	1869	445	230	87.69	48.31
grid_6_4	qnn	914	158	2721	450	813	70.12	-80.67	1368	448	338	75.29	24.55
grid_6_4	portfolioqaoa	1260	192	4404	597	1197	72.82	-100.5	2050	601	430	79.02	28.45
grid_6_4	random	1992	$\frac{412}{327}$	1821 4404	924 684	$1257 \\ 744$	$30.97 \\ 83.11$	-36.04	1904 $2212$	$1056 \\ 902$	$577 \\ 429$	$69.7 \\ 80.61$	45.36 $52.44$
$ grid_{-}6_{-}4 $ $ ring_{-}5_{-}4 $	portfoliovqe	$2505 \\ 17$	327 17	4404	18	744	nan	-8.77 -300	$\frac{2212}{17}$	$\frac{902}{35}$	$\frac{429}{34}$	-100	$\frac{52.44}{2.86}$
$ring_{-5}_{-4}$	$_{ m dj}^{ m ghz}$	118	22	153	36	30	80.39	-300 16.67	113	33 71	$\frac{34}{32}$	71.68	54.93
$ring_5_4$ $ring_5_4$	graphstate	150	30	93	27	78	16.13	-188.89	92	36	$\frac{32}{36}$	60.87	0
$ring_5_4$	vqe	253	31	0	18	nan	nan	nan	31	43	nan	nan	nan
$ring_5_4$	wstate	253	135	0	30	123	nan	-310	135	150	103	23.7	31.33
$ring_5_4$	qaoa	285	34	171	54	102	40.35	-88.89	250	62	48	80.8	22.58
$ring_5_4$	qft	591	118	1089	309	nan	nan	nan	609	317	nan	nan	nan
$ring_5_4$	qftentangled	608	122	1089	336	nan	nan	nan	613	387	nan	nan	nan
$ring_5_4$	realamprandom	615	77	2934	888	nan	nan	nan	1623	587	nan	nan	nan
$ring_5_4$	two local random	615	77	2934	777	nan	nan	nan	1623	495	nan	nan	nan
$ring_5_4$	su2random	675	81	2934	831	nan	nan	nan	1661	612	nan	nan	nan
$\operatorname{ring}_{-}5_{-}4$	qnn	914	158	2007	528	nan	nan	nan	1304	590	nan	nan	nan
$ring_5_4$	portfolioqaoa	1260	192	2934	765	nan	nan	nan	1933	786	nan	nan	nan
$ring_5_4$	random	1992	412	1872	927	nan	nan	nan	2089	1175	nan	nan	nan
ring_5_4	portfoliovqe	2505	327	2934	900	nan	nan	nan	2162	952	nan	nan	nan
t_horizontal_5_4 t_horizontal_5_4	ghz	17 118	$\frac{17}{22}$	$\frac{27}{384}$	18 33	$\frac{36}{27}$	-33.33 92.97	-100	44 $137$	32 70	28 40	$36.36 \\ 70.8$	$12.5 \\ 42.86$
t_horizontal_5_4	dj graphstate	150	22 26	90	33 27	21 111	-23.33	18.18 -311.11	$\frac{137}{72}$	32	$\frac{40}{42}$	41.67	-31.25
t_horizontal_5_4	vqe	253	31	63	3	51	19.05	-1600	79	40	47	40.51	-31.25 -17.5
t_horizontal_5_4	wstate	253	135	63	3	42	33.33	-1300	166	135	117	29.52	13.33
t_horizontal_5_4	qaoa	285	34	348	60	207	40.52	-245	337	65	66	80.42	-1.54
$t_{horizontal_5_4}$	qft	591	118	1842	420	519	71.82	-23.57	729	278	170	76.68	38.85
$t_{horizontal_5_4}$	qftentangled	608	122	1788	408	543	69.63	-33.09	698	375	177	74.64	52.8
$t_{borizontal_5_4}$	realamprandom	615	77	5859	1020	1020	82.59	0	1927	599	234	87.86	60.93
$t_horizontal_5_4$	two local random	615	77	5859	879	1020	82.59	-16.04	1927	430	234	87.86	45.58
$t_horizontal_5_4$	su2random	675	81	5859	975	1020	82.59	-4.62	1970	514	237	87.97	53.89
$t_{horizontal_5_4}$	qnn	914	158	4041	594	1065	73.65	-79.29	1458	427	355	75.65	16.86
$t_{horizontal_5_4}$	portfolioqaoa	1260	192	5859	849	1359	76.8	-60.07	2156	650	420	80.52	35.38
t_horizontal_5_4	random	1992	412	2613	1422	1815	30.54	-27.64	2408	1155	644	73.26	44.24
t_horizontal_5_4	portfoliovqe	2505	327	5859	963	1047	82.13	-8.72	2288	809	431	81.16	46.72
t_vertical_5_4 t_vertical_5_4	ghz	17 118	$\frac{17}{22}$	$\frac{45}{318}$	$\frac{15}{36}$	$\frac{54}{27}$	-20 91.51	-260 25	$62 \\ 131$	32 73	29 38	53.23 $70.99$	$9.38 \\ 47.95$
t_vertical_5_4	dj graphstate	150	26	78	30 24	$\frac{27}{120}$	-53.85	-400	68	39	30 49	27.94	-25.64
t_vertical_5_4	vqe	253	31	150	36	99	-95.65 34	-400 -175	94	77	48	48.94	37.66
t_vertical_5_4	wstate	$\frac{253}{253}$	135	126	15	84	33.33	-460	200	147	97	51.5	34.01
t_vertical_5_4	qaoa	285	34	336	66	171	49.11	-159.09	351	57	68	80.63	-19.3
t_vertical_5_4	qft	591	118	1680	369	615	63.39	-66.67	642	327	222	65.42	32.11
$t_{\text{vertical}}_{-5}_{-4}$	qftentangled	608	122	1764	408	621	64.8	-52.21	653	382	234	64.17	38.74
$t_{\text{-}} vertical_{\text{-}}5_{\text{-}}4$	realamprandom	615	77	5304	1044	1098	79.3	-5.17	1919	565	261	86.4	53.81
$t_{\text{-}}vertical_{\text{-}}5_{\text{-}}4$	twolocalrandom	615	77	5304	1059	1098	79.3	-3.68	1919	596	261	86.4	56.21
$t_{vertical_5_4}$	su2random	675	81	5304	1041	1098	79.3	-5.48	1962	604	265	86.49	56.13
$t_{vertical_5_4}$	qnn	914	158	3669	618	1077	70.65	-74.27	1449	547	344	76.26	37.11
$t_{vertical_5_4}$	portfolioqaoa	1260	192	5304	822	1440	72.85	-75.18	2150	664	430	80	35.24
$t_{vertical_5_4}$	random	1992	412	2475	1239	1800	27.27	-45.28	2366	1243	658	72.19	47.06
t_vertical_5_4	portfoliovqe	2505	327	5304	1014	1251	76.41	-23.37	2280	881	456	80	48.24
line_1_20	ghz	17	17	0	27	42	nan	-55.56	17	29	20	-17.65	31.03
line_1_20	dj	118	22	546	57 27	36	93.41	36.84	146	104	45	69.18	56.73
line_1_20	graphstate	150	26	99	27	90	9.09	-233.33	72	35	38	47.22	-8.57

Table 3: Additional swap gates and circuit depth,  $n\,=\,15$ 

layout	benchmark	g	d	$s_B$	$s_S$	$s_L$	$\Delta s_B$	$\Delta s_S$	$d_B$	$d_S$	$d_L$	$\Delta d_B$	$\Delta d_S$
line_1_20	vqe	253	31	0	0	42	nan	nan	31	31	43	-38.71	-38.71
$line_1_20$	wstate	253	135	0	0	42	nan	nan	135	135	121	10.37	10.37
$line_1_20$	qaoa	285	34	438	63	210	52.05	-233.33	391	53	71	81.84	-33.96
$line_1_20$	qft	591	118	2877	450	519	81.96	-15.33	742	322	170	77.09	47.2
$line_1_20$	qftentangled	608	122	2877	420	543	81.13	-29.29	746	308	177	76.27	42.53
$line_1_20$	realamprandom	615	77	8190	882	936	88.57	-6.12	1996	418	162	91.88	61.24
$line_1_20$	twolocalrandom	615	77	8190	915	936	88.57	-2.3	1996	402	162	91.88	59.7
$line_1_20$	su2random	675	81	8190	876	936	88.57	-6.85	2039	451	165	91.91	63.41
$line_1_20$	qnn	914	158	5460	591	732	86.59	-23.86	1442	431	234	83.77	45.71
$line_1_20$	portfolioqaoa	1260	192	8190	876	948	88.42	-8.22	2165	591	260	87.99	56.01
$line_1_20$	$\operatorname{random}$	1992	412	3348	1545	1926	42.47	-24.66	2915	1131	656	77.5	42
$line_1_20$	portfoliovqe	2505	327	8190	876	948	88.42	-8.22	2297	655	378	83.54	42.29