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Chapitre 1

Experiment 1 - State Vector - 1 qubit

On est trop souvent imprécis lorsqu'on fait une citation.

Quelqu'un, un jour.

Full 1st experiment explanation

1.1 State Vector - 1 Qubit

1.1.1 Base H with full Z rotation

Code

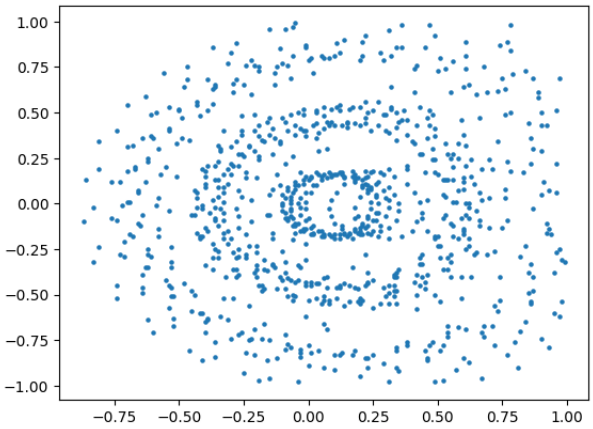
```
print("Launch!")
qc.h(init_q)
for w in range(max_shots):
    for i in range(shots):
        qc.rx(-pi/(shots-i), init_q)
        qc.rz(pi/(shots/8), init_q)
        z, z_north, z_south = complex_cal(qc, statevector_sim)
        if z != 0:
            if z_north != 0:
                tab_temp[0].append(z)
                tab_temp[1].append(z_north)
            if z_south != 0:
                tab_temp[0].append(z)
                tab_temp[2].append(z_south)
    qc.barrier()

    if (w + 1) % 5 == 0:
        print("Full circuit bloch :", w+1, "/", max_shots)

print("Done!")
```

Run 1 full circuit block only

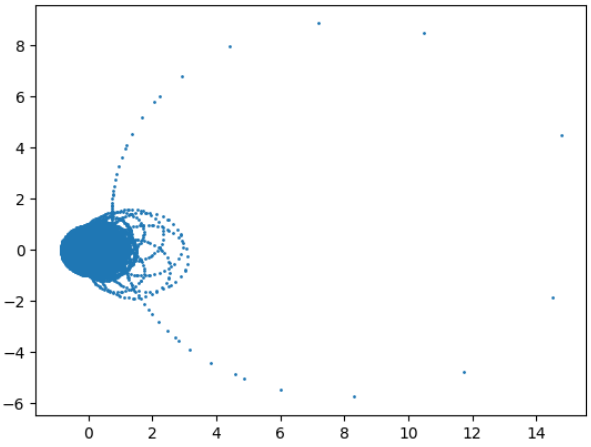
Run 10 full circuit block only



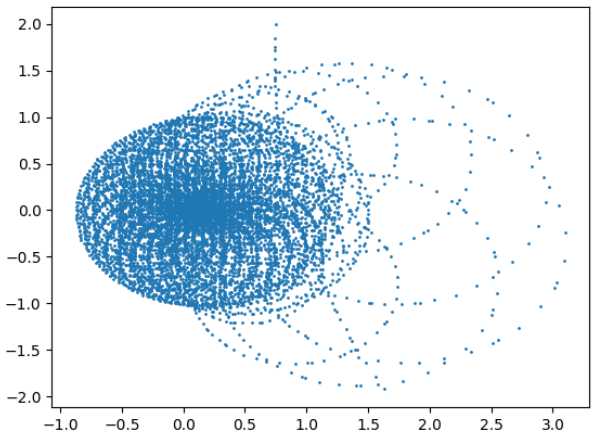
(a) Graph with zoom of [[-1 :1][-1 :1]]

FIGURE 1.1 – Resulting of 1000 data statevector

Run 100 full circuit block only



(a) Graph from 10000 data statevector without zoom



(b) Graph with zoom of [[-1 :2][-1 :1]]

FIGURE 1.2 – Resulting of 10000 data statevector

1.1.2 Base H with no-full Z rotation

Code

```
print("Launch!")
qc.h(init_q)
```

```
for w in range(max_shots):
    for i in range(shots):
        qc.rx(-pi/(shots-i), init_q)
        qc.rz(pi/(shots/8), init_q)
        z, z_north, z_south = complex_cal(qc, statevector_sim)
        if z != 0:
            if z_north != 0:
                tab_temp[0].append(z)
                tab_temp[1].append(z_north)
            if z_south != 0:
                tab_temp[0].append(z)
                tab_temp[2].append(z_south)
    qc.barrier()

    if (w + 1) % 5 == 0:
        print("Full circuit bloch :", w+1, "/", max_shots)

print("Done!")
```

Run 1 full circuit block only

Run 10 full circuit block only

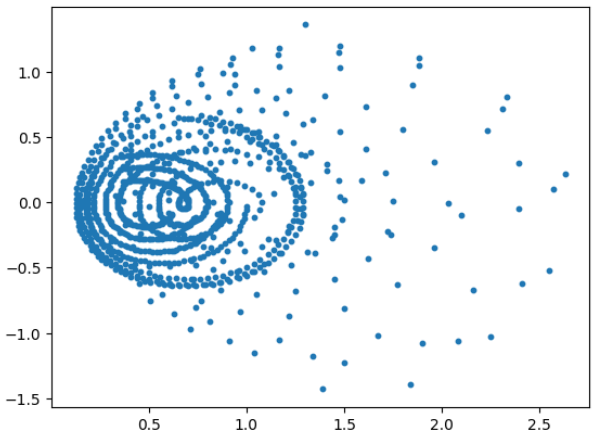


FIGURE 1.3 – Resulting of 1000 data statevector

Run 100 full circuit block only

1.1.3 Base 0

Code

```
print("Launch!")
for w in range(max_shots):
    for i in range(shots):
        qc.rx(-pi/(shots-i), init_q)
```

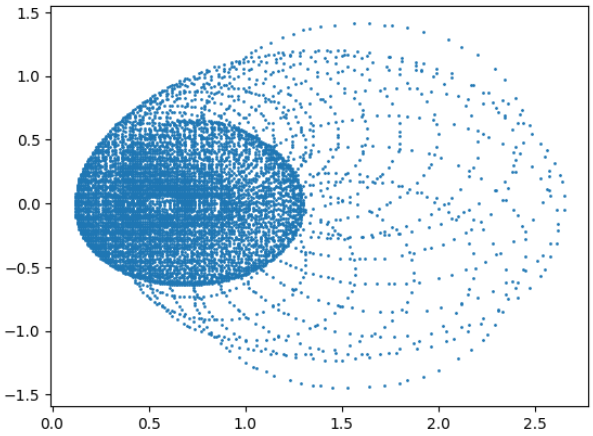


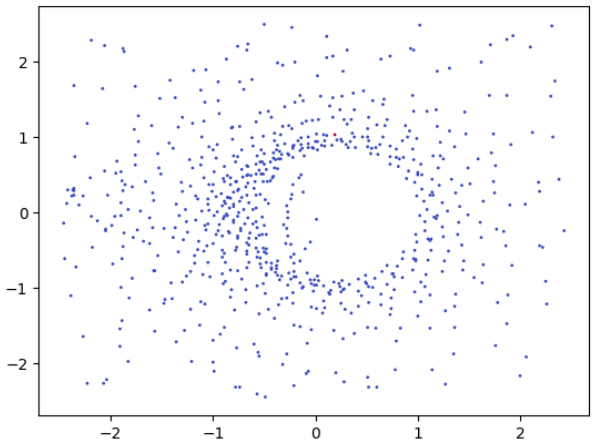
FIGURE 1.4 – Resulting of 1000 data statevector

```
5           qc.rz(pi/(shots/8), init_q)
6           z, z_north, z_south = complex_cal(qc, statevector_sim)
7           if z != 0:
8               if z_north != 0:
9                   tab_temp[0].append(z)
10                  tab_temp[1].append(z_north)
11              if z_south != 0:
12                  tab_temp[0].append(z)
13                  tab_temp[2].append(z_south)
14      qc.barrier()
15
16      if (w + 1) % 5 == 0:
17          print("Full circuit bloch :", w+1, "/", max_shots)
18
19  print("Done!")
```

Totototo

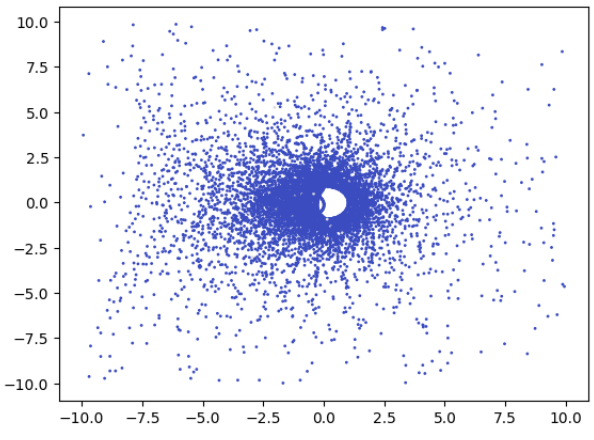
Run 10 full circuit block only

Run 100 full circuit block only

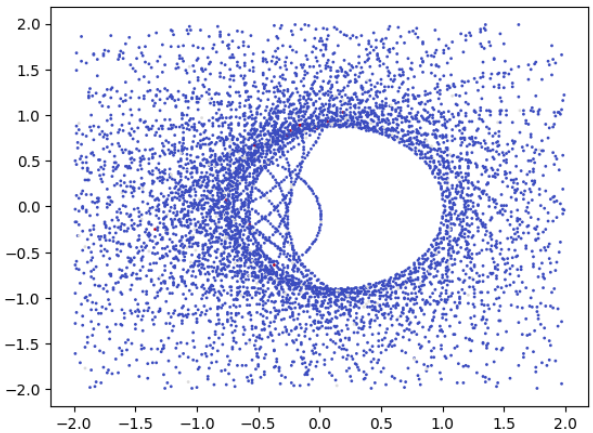


(a) Graph with zoom of [[-2 :2][-2 :2]]

FIGURE 1.5 – Resulting of 1000 data statevector



(a) Graph from 10000 data statevector without zoom



(b) Graph with zoom of [[-2 :2][-2 :2]]

FIGURE 1.6 – Resulting of 10000 data statevector