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SIMPAC-2024-159 / README.md

 phibal12 Update README.md

5e5ba94 · 1 hour ago

141 lines (106 loc) · 10.5 KB

Preview Code Blame

Raw    

QFLCS: Quantum Field Lens Coding Simulator

Technical:  GitHub SoftwareImpacts Mendeley Data v.3+ Code in VS Code v.1.3 Python v.3+ Jupyter Lab Open in Code Ocean

Social:  GitHub phibal12 profile + projects  LinkedIn

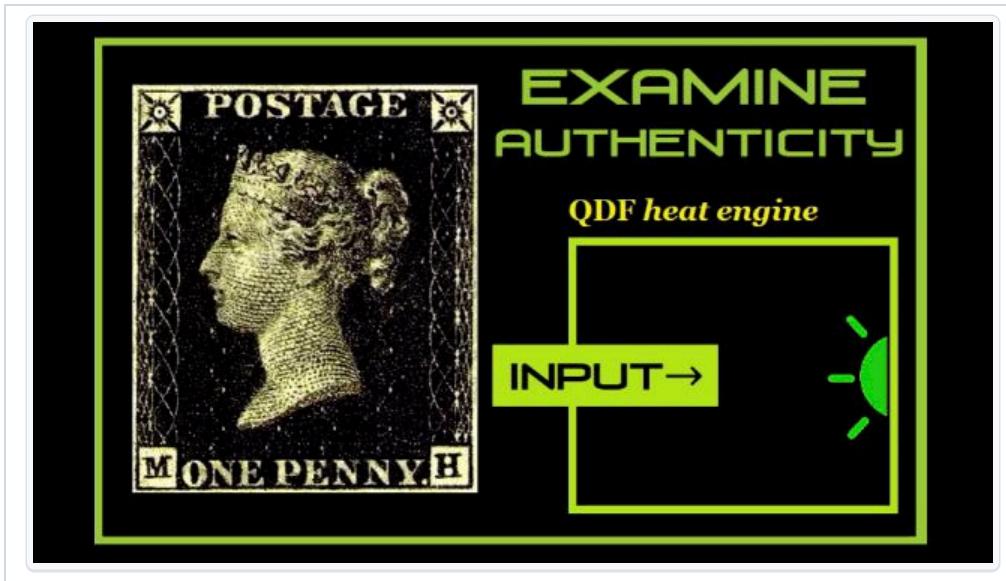
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This repository contains the code for the QFLCS (Quantum Field Lens Coding Simulator) as part of its algorithm, QFLCA (Quantum Field Lens Coding Algorithm) project. The project repositories are available at <https://data.mendeley.com/datasets/gf2s8jkdfj/3> and <https://doi.org/10.24433/CO.9905505.v2>, which include the code, project website documentation, and demo video files.

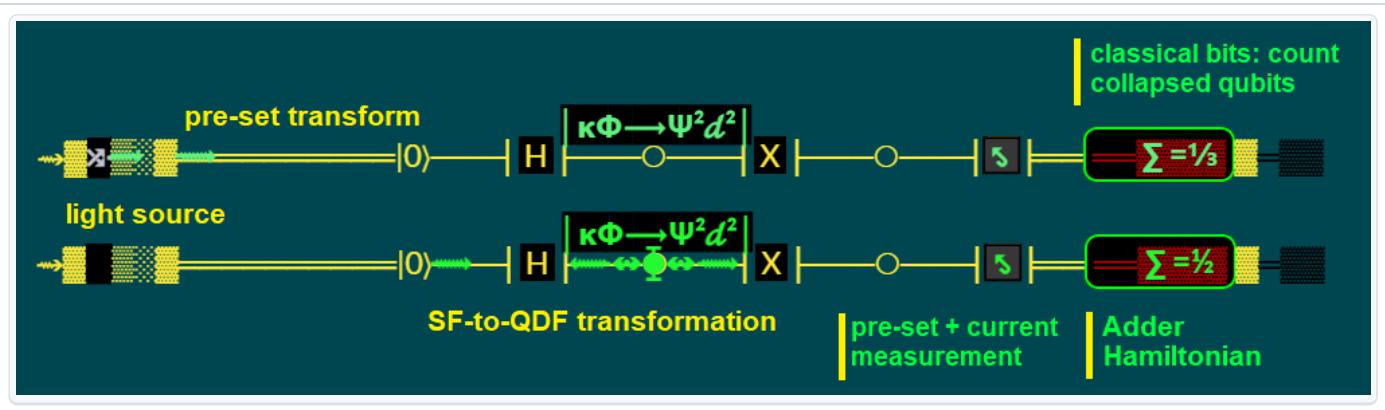


The QFLCS program analyzes the measurement outcome probability (P) data from datasets generated by Quantum Double-field (QDF) Circuits. The datasets are compared between ES and GS states as a P indicator generated for measurement samples. Small dataset samples denote:



QDF Heat Engine Sampling from the Oldest Postal Stamp and Simulating the I/O by QFLCS

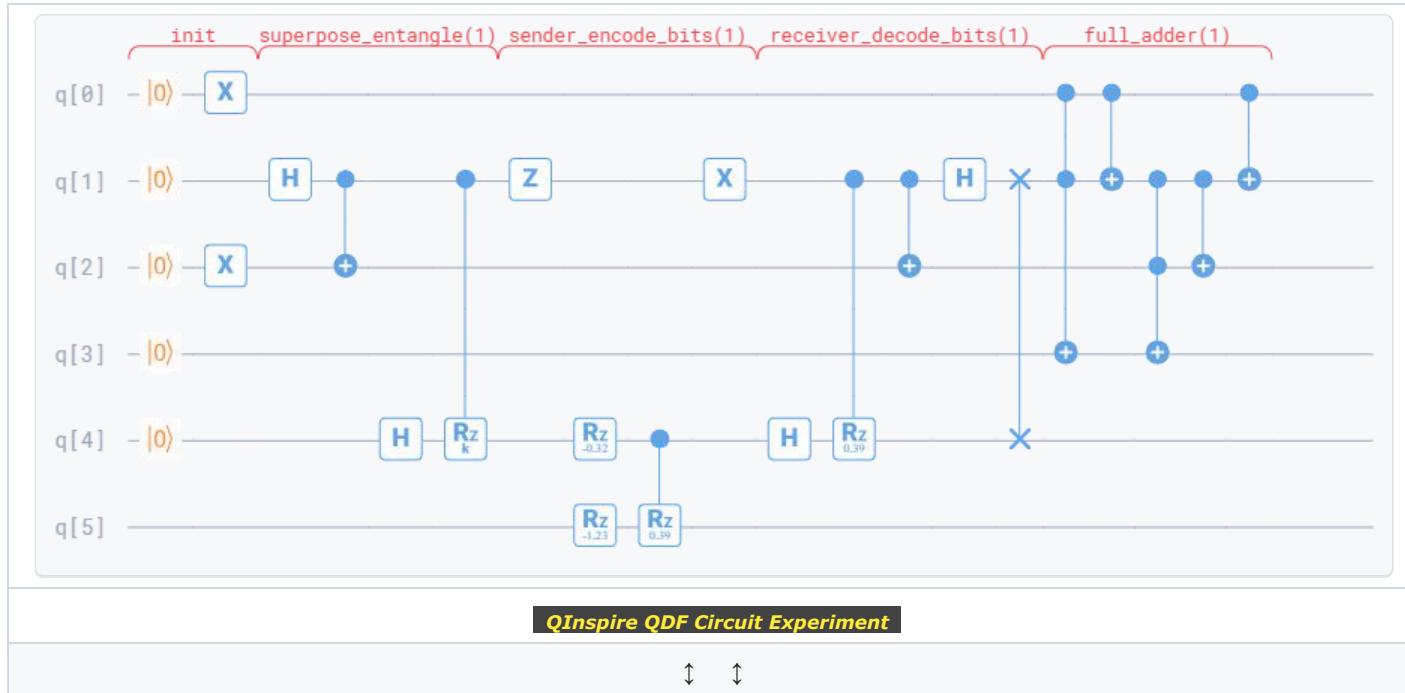
- a) A particle pair's energy state in a QDF (different GS states or sublevels of a GS, or see Sec. 3 of the published article),
- b) a particle state in an SF, an ES relative to a GS from (a.), prior to its transform into a QDF, and,
- c) the expected transformation of fields (ES \leftrightarrow GS) and their $\langle M(P, \psi_{ij}) \rangle$, as in Sec. 3 of the published article.



QDF Circuit Measured from a Sum (Σ) of Single Field (SF) to QDF Transformations of Qbit-pairs

This repository's file structure is a sample mirror of the Mendeley repository file structure of v3+ at <https://data.mendeley.com/datasets/qf2s8jkdjf/3>, but with a much smaller file size for efficient download and use of the QFLCA project's code without the documentation (website) and demo video files. Certain small updates have been made in the main python file uploaded on Code Ocean for minor debugging purposes at <https://doi.org/10.24433/CO.9905505.v2> or [Code Ocean](#).

- QFLCA project's code without the documentation (website) and demo video files can be found under the `</code/root/lab/sim/QFLCC classifiers>` directory in `</code/root/lab/sim/QFLCC classifiers/docs>` and `</code/root/lab/sim/QFLCC classifiers/site>` folders at <https://doi.org/10.24433/CO.9905505.v2> or [Code Ocean](#).
- The main file is `</code/root/lab/sim/QFLCC classifiers/QAI-LCode_QFLCC>` which imports and executes the `</code/root/lab/sim/QFLCC classifiers/QDF-LCode_IBMQ-2024-codable>` or `QDF-LCode_IBMQ-2024` code for the simulation under Win OS or Linux OS.



2 over 3 (with swap gate error cheat) 2023-12-02 - 3:51:18 p.m. | Optimized

Device:

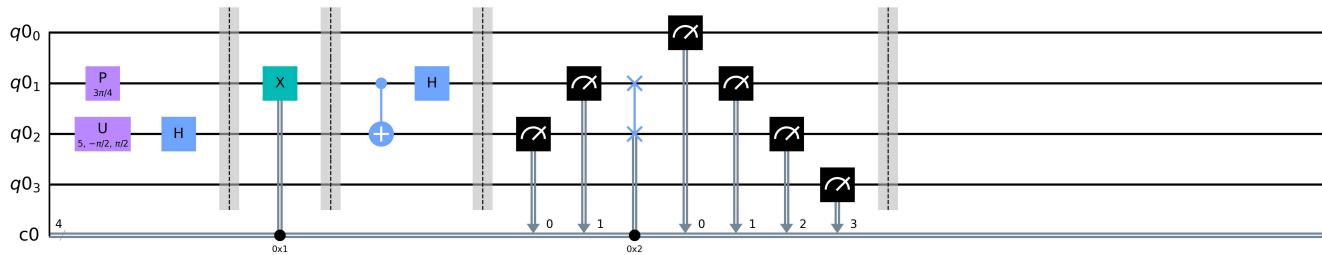
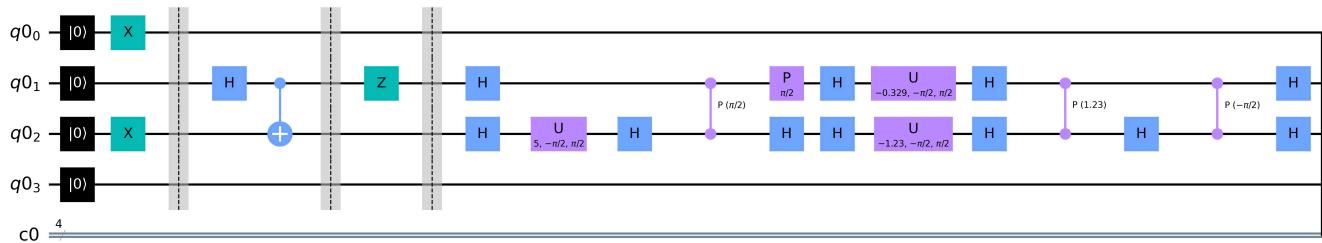
QX single-node simulator

Number of shots:

1024

Execution time:

0.092s

***QInspire QDF Circuit Experiment Result******IBM QDF Circuit Experiment***

In([QInspire, IBMQ] QDF Circuit) → **QFLCS** → **Out**([QInspire, IBMQ] QDF Circuit Data) → **In**(QFLCC) → **Out**(↴)

"(° ½ °) vs (° ½ °)(圆括号) ° ½ °) °) vs [§(¼ ¾)] vs "((¼ ¾))" vs ---Σ(((¼ ¾))

Alice & Bob's Quantum Doubles... This OFLCC game version of the QAI-LCode is basic.

More revisions to come, as the dataset grows on the number of trials on 1 or more QDF circuits for simulating the QDF game. The QDF game simulates events of the dataset's quantum and classical parameters in observing a thermodynamic system = { QDF game environment and its participants Alice, Bob, Eve, Audience } based on Refs. [1-2,4] of the Data in Brief, Elsevier J article. ver.1.0

QDF Game Intro from the QFLCA/QFLCS program

- The User and Developer's documentation/manual/demo is found under the `</code/root/lab/sim/QFLCC classifiers>` directory, as `<site-prints/...>` and `<site/...>` contents.
 - In each folder: `<QFLCC classifiers/IBMQ>`, `<.../sim/QAI>`, `</QFLCC classifiers>`, and `<QI/...>`, under `</code/root/lab/sim>`, `[Tips.txt]` and/or `[ReadMe.txt]` files exist to explain the contents of that directory. Also, under `</code/root/lab>` directory, a `ReadMe` file exists explaining the manual computation and presentation parts of the project.

```

Level 0 engaged!
In this game, are you Bob [o] the guest, or Alice [♣] the host to win a/the prize (targetted energy state) [★]? Choose 1 for Bob, 2 for Alice: 2
For your game participant 2, will Eve [♦] join by quantum means to secretly share information about the prize [★]? Choose 3 to have Eve spying, 4 for Audience [♦] to cheer/su
ggest and raise/lower participant 2's energy state: 3
Enter a P value for participant #2, : 0.62
> n
Next...

List of tried P's: [0.62]
List of assigned weights: [0.0]
List of matched AP's: [0.0]
Subset of tried P's: {0.62}
Duplicated P tries: set()
Subset of calculated ΔP's: {0.0}
Duplicates of matched P's: set()
P value 0.62 guessed an undefined P outcome of the qubit dataset. Your successful hit weight was: [0, inf]
Hello, Quantum World!
Correlation to strong prediction result for participant #2, [♦], is high to win: 0.944219
Bob loses to Alice. Alice wins to keep the prize with Eve's help! YOU WIN!
These doubles won the prize: ['01', '1b'], QDF P match is: 0.94
Your score is: 10. Scoresheet is: [0, 10]
==Σ(((☀️⭐️☀️)☀️[$])  

Level 1 engaged!  

==Σ(((☀️(○ ⓘ○)☀️[$])  

Next... Level: 1  

In this game, are you Bob [o] the guest, or Alice [♣] the host to win a/the prize (targetted energy state) [★]? Cho
For your game participant 2, will Eve [♦] join by quantum means to secretly share information about the prize [★]? C
ggest and raise/lower participant 2's energy state: 3
Enter a P value for participant #2, [♦]: 0.33
> n
Next...

List of tried P's: [0.62, 0.33]
List of assigned weights: [0.0, 1.059]
List of matched AP's: [0.0, 0.06]
Subset of tried P's: {0.62, 0.33}
Duplicated P tries: set()
Subset of calculated ΔP's: {0.0, 0.06}
Duplicates of matched P's: set()
P value 0.33 guessed a strong classical P outcome and correlated with max(ΔP)=min(P) of qubit dataset. Your successful
Hello, Quantum World!
Correlation to strong prediction result for participant #2, [♦], is low to win: 0.65
Bob loses to Alice despite Eve's help. Alice wins to keep the prize! YOU [♦] via [♦] LOSE!
These doubles lost the prize: ['01', '1b'] lost the prize to ['10'], QDF P match is: 0.65
Your score is: 5. Scoresheet is: [0, 10, 10, 5]
==Σ(((☒(☒)☒))  

Level 0 initiated! Your score is: 5.  

==Σ(((☀️(○ ⓘ○)☀️[$])  

Level 0 engaged!

Next... Level: 0  

In this game, are you Bob [o] the guest, or Alice [♣] the host to win a/the prize (targetted energy state) [★]? Choose
For your game participant 1, will Eve [♦] join by quantum means to secretly share information about the prize [★]? Cho
ggest and raise/lower participant 1's energy state: 4
Enter a P value for participant #1, [♦]: 0.63
> n
Next...

List of tried P's: [0.62, 0.33, 0.63]
List of assigned weights: [0.0, 1.059, 1.529]
List of matched AP's: [0.0, 0.06, 0.35]
Subset of tried P's: {0.62, 0.33, 0.63}
Duplicated P tries: set()
Subset of calculated ΔP's: {0.0, 0.35, 0.06}
Duplicates of matched P's: set()
P value 0.63 guessed a classical P outcome and correlated with min(ΔP)= max(P) of qubit dataset. Your successful hit weight was: 1.529
Hello, Quantum World!
Correlation to strong prediction result for participant #1, [o], is high to win: 0.954219
Alice loses to Bob. Bob wins the prize as the Audience cheer without Eve's help! YOU WIN!
These doubles won the prize: ['01', '1b'], QDF P match is: 0.95
Your score is: 15. Scoresheet is: [0, 10, 10, 5, 5, 15]
==Σ(((☀️⭐️☀️)☀️[$])  

Level 1 engaged!  

==Σ(((☀️(○ ⓘ○)☀️[$])  

Next... Level: 1  

In this game, are you Bob [o] the guest, or Alice [♣] the host to win a/the prize (targetted energy state) [★]? Choose
For your game participant 2, will Eve [♦] join by quantum means to secretly share information about the prize [★]? Cho
ggest and raise/lower participant 2's energy state: 4
Enter a P value for participant #2, [o]: 0.62
> n
Next...

List of tried P's: [0.62, 0.33, 0.63, 0.62]
List of assigned weights: [0.0, 1.059, 1.529, 1.048]
List of matched AP's: [0.0, 0.06, 0.35, 0.05]
Subset of tried P's: {0.62, 0.33, 0.62}
Duplicated P tries: {0.62}
Subset of calculated ΔP's: {0.0, 0.35, 0.06, 0.05}
Duplicates of matched P's: set()
Duplicates (0.62) found in your tried P's list! Try again...
||[[✖️ @ ⚡]$]||

```

==Σ(((☀️⭐️☀️)☀️[\$])

Level 1 engaged!

==Σ(((☀️(○ ⓘ○)☀️[\$])

A custom victorious emoji is
animated with a retro style sound.
Levels can go up or down
depending on the energy
scoresheet obtained as losses and
gains in winning a prize [★] (TS)
and/or the prize given the energy
state by the user (as Bob or Alice)

==Σ(((☒(☒)☒))

Level 0 initiated! Your

==Σ(((☀️(○ ⓘ○)☀️[\$])

Level 0 engaged!

A game loss of Bob [o] to Alice

[♣] far from a TS hit, despite Eve
[♣]'s help. Perhaps, there was not a
good cheat sheet.

Hence, a more intelligent
algorithm can be trained for the
user based on this experience if
the user chooses. In this scenario,
we see the level descended from
Level 1 to Level 0 for the user,
and the loss icon shows an
animated crying emoji.

==Σ(((☀️⭐️☀️)☀️[\$])

A close hit and gain of a prize [★].

This scores a good win due to w
being close to 1.

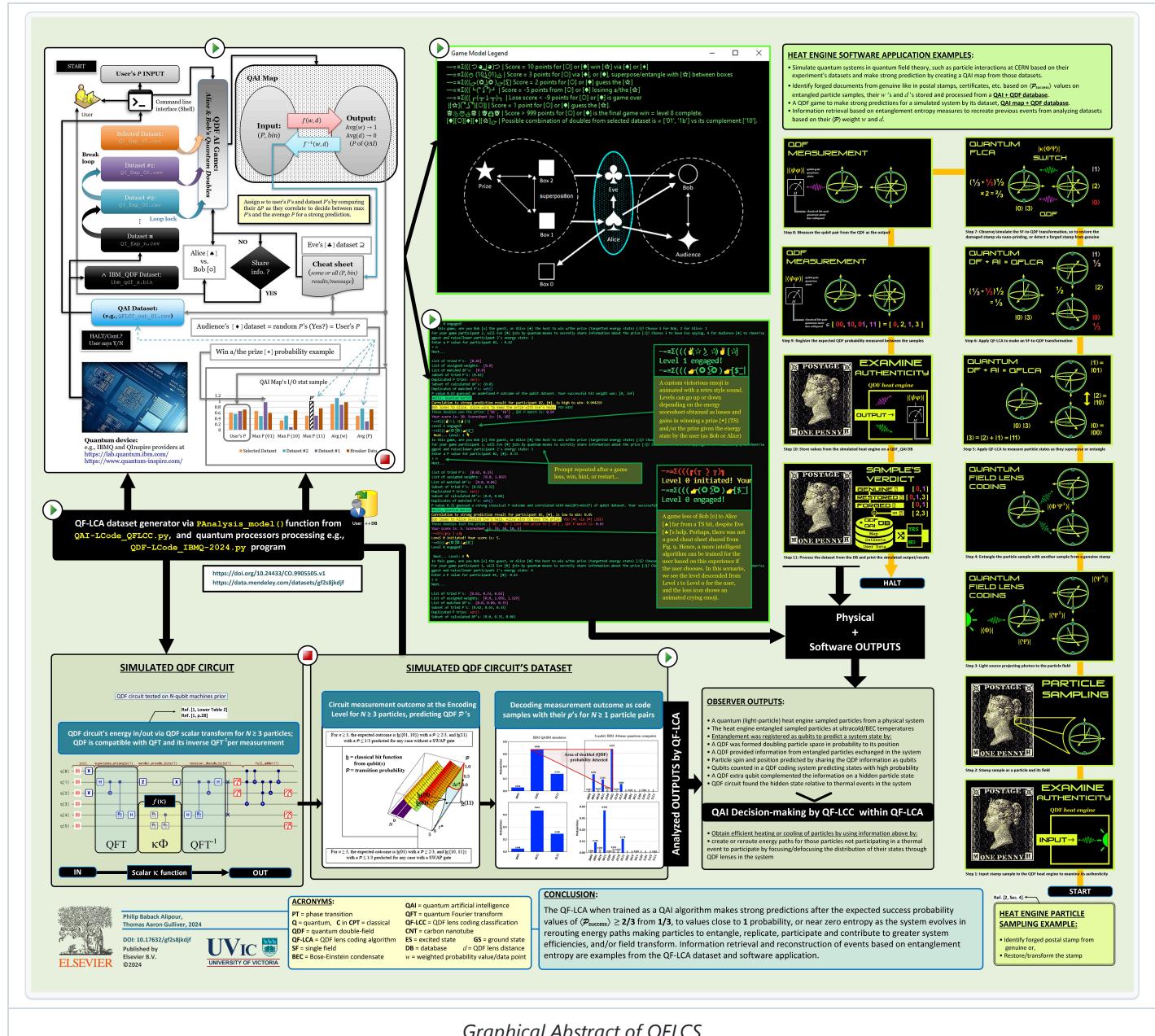
QDF Game Scores on Wins and Losses of the User/Gamer based on the Input Samples by the QFLCS

- Graphical Abstract files can be accessed from </code/root> .

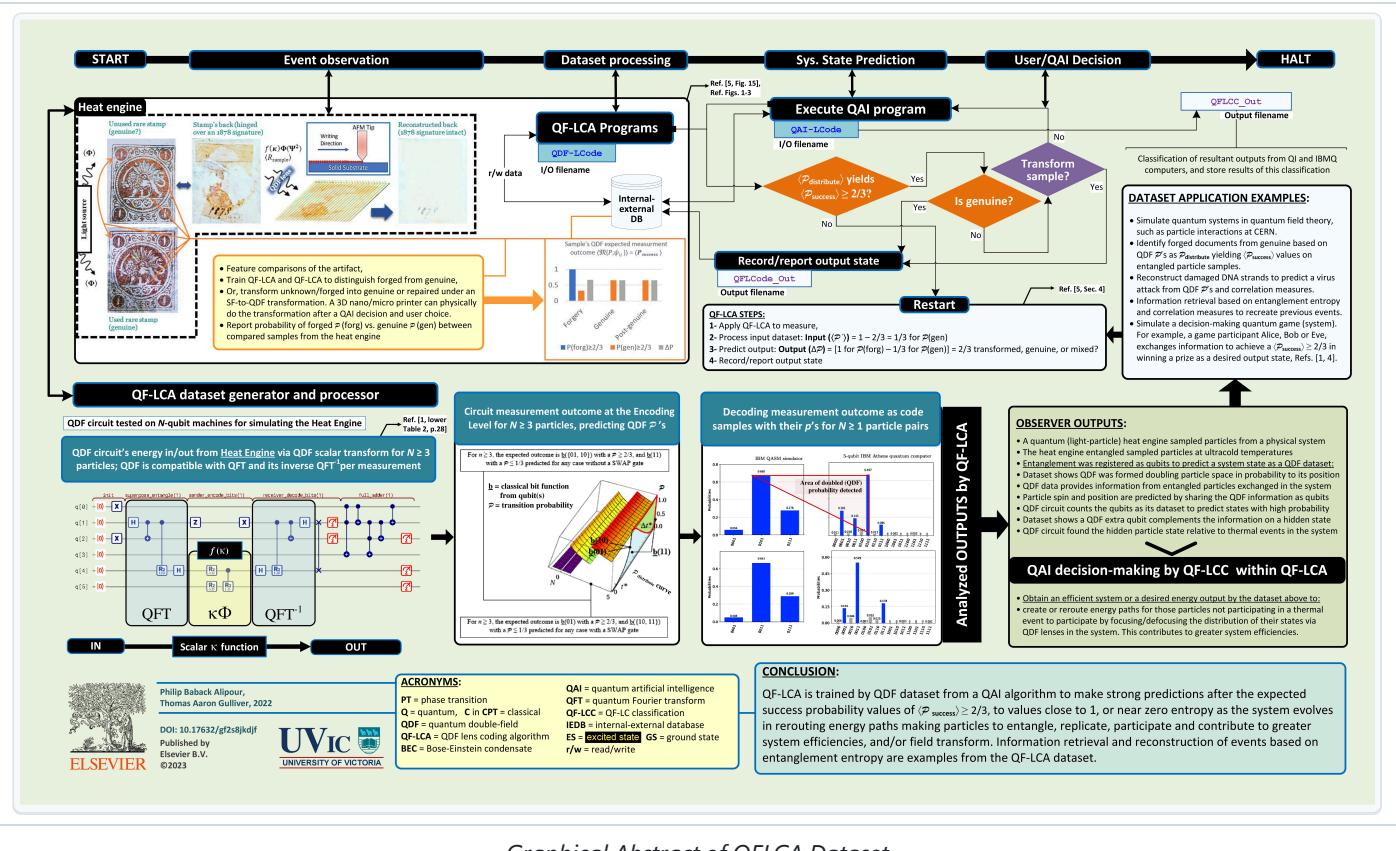
Visual Project Summary

The QFLCA project is going through stages of development resulting in software products, such as QFLCC and QFLCS programs. These products have been summarized in form of peer-reviewed published articles with their corresponding Graphical Abstracts representing this project.

- The following figure is a downloadable High-Res Graphical Abstract of the published QFLCS article in Software Impacts, Elsevier BV, at: <https://www.sciencedirect.com/science/article/pii/S2665963824000915>

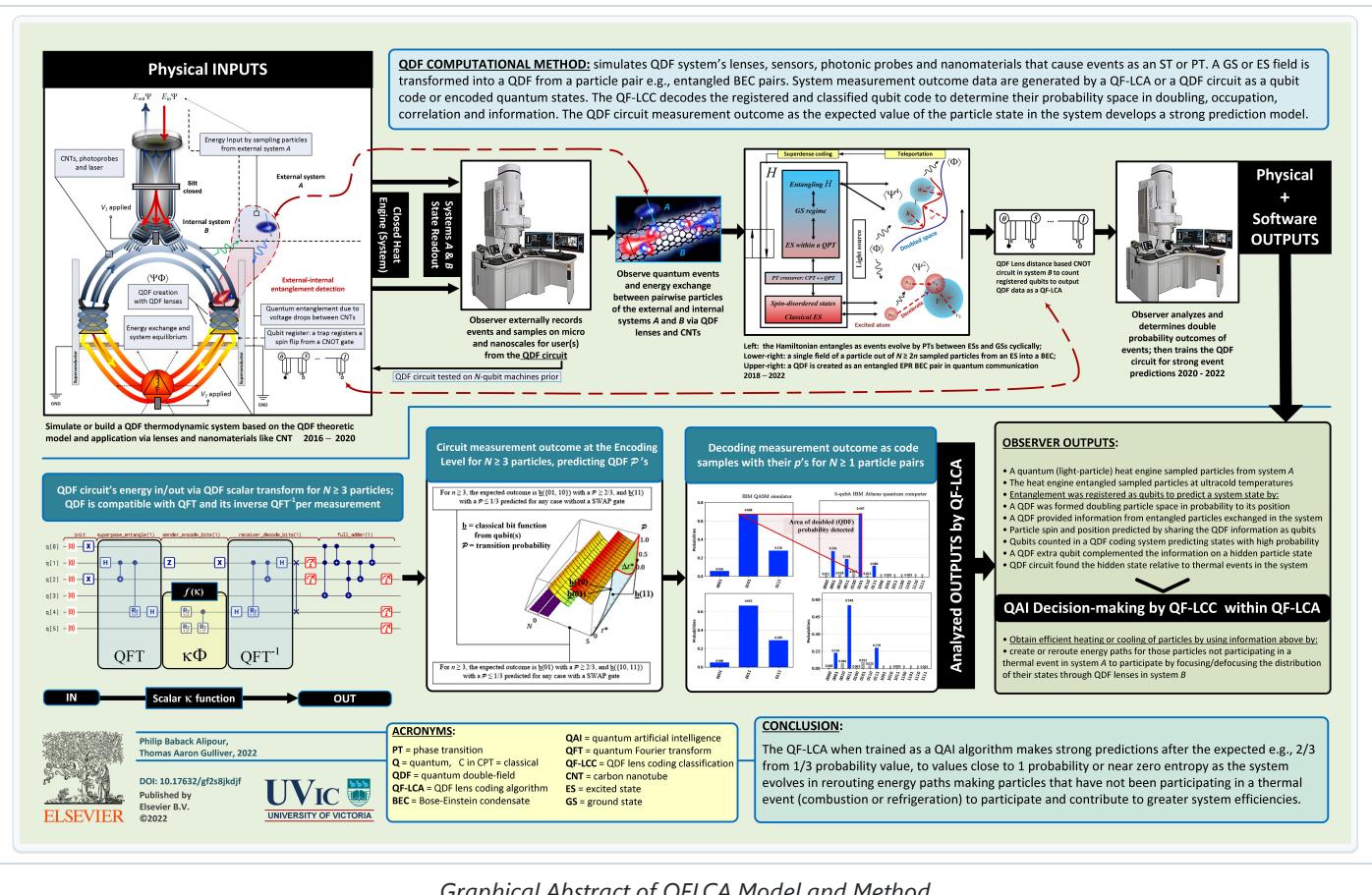


- The following figure is a downloadable High-Res Graphical Abstract of the published QFLCA article in Data in Brief, Elsevier BV, at: <https://www.sciencedirect.com/science/article/pii/S2352340924007546>



Graphical Abstract of QFLCA Dataset

- The following figure is a downloadable High-Res Graphical Abstract of the published QFLCA article in MethodsX, Elsevier BV, at: <https://www.sciencedirect.com/science/article/pii/S221501612300136X>



Graphical Abstract of QFLCA Model and Method

Citation

If you find this repository useful in your research, please cite one or both of the following articles as:

- P. B. Alipour, T. A. Gulliver, QF-LCA Dataset: Quantum Field Lens Coding Algorithm for System State Simulation and Strong Predictions, Data in Brief, Eslevier BV, 2024, 110789, ISSN 2352-3409, <https://doi.org/10.1016/j.dib.2024.110789>.

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@article{110789,
author = {Alipour, P.B. and Gulliver, T.A.},
title = {QF-LCA Dataset: Quantum Field Lens Coding Algorithm for System State Simulation and Strong Predictions},
journal = {Data in Brief, Eslevier BV},
year = {2024},
artnum = {110789},
doi = {10.1016/j.dib.2024.110789},
url = {https://www.sciencedirect.com/science/article/pii/S2352340924007546}
```

- P. B. Alipour, T. A. Gulliver, QF-LCS: Quantum Field Lens Coding Simulator and Game Tool for Strong System State Predictions, Software Impacts, Eslevier BV, 2024, 100703, ISSN 2665-9638, <https://doi.org/10.1016/j.simpa.2024.100703>.

```
@article{100703,
author = {Alipour, P.B. and Gulliver, T.A.},
title = {QF-LCS: Quantum Field Lens Coding Simulator and Game Tool for strong system state predictions},
journal = {Software Impacts, Eslevier BV},
pages = {100703},
year = {2024},
issn = {2665-9638},
doi = {doi.org/10.1016/j.simpa.2024.100703},
url = {https://www.sciencedirect.com/science/article/pii/S2665963824000915}
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