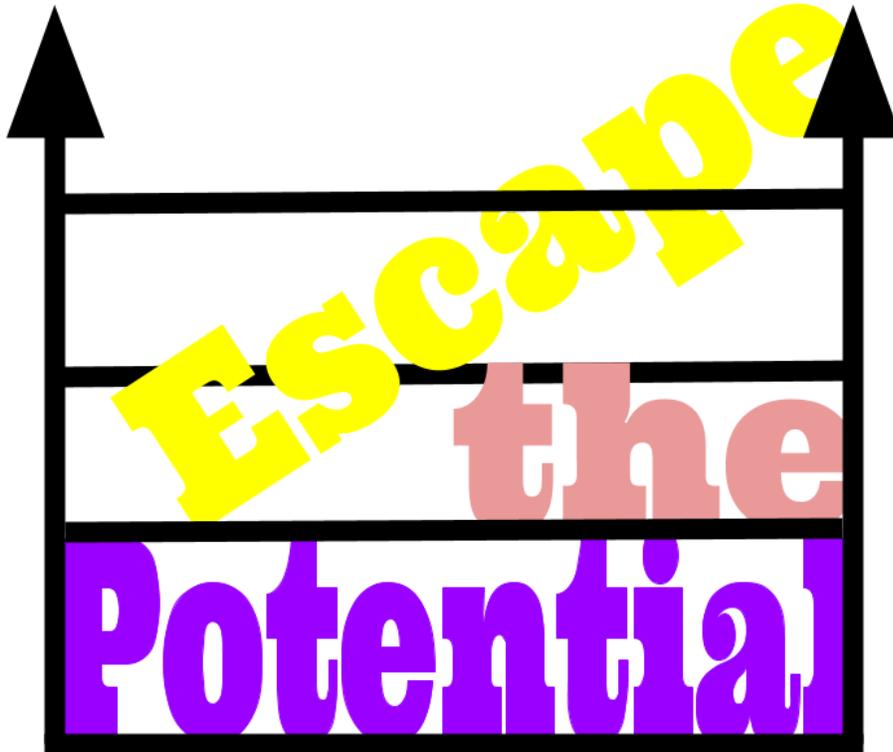


Physics 310

# Escape the Potential: Rulebook

A Card Game of Quantum Immersion

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## Goal of the Game

This is a deck building game in which each player (playing as a particle) takes turns trying to escape the potential well. In order to move their piece up each eigenstate, players take turns drawing cards from their decks and purchasing card in order to buy cards that advance their pawn up the well. Every turn, each person reshuffles their deck and restarts their pawn from the lowest eigenstate. The game ends when one person reaches the uppermost eigenstate. When playing with the Finite Square Well and Harmonic Oscillator boards, a player can also win the game by “tunneling.”

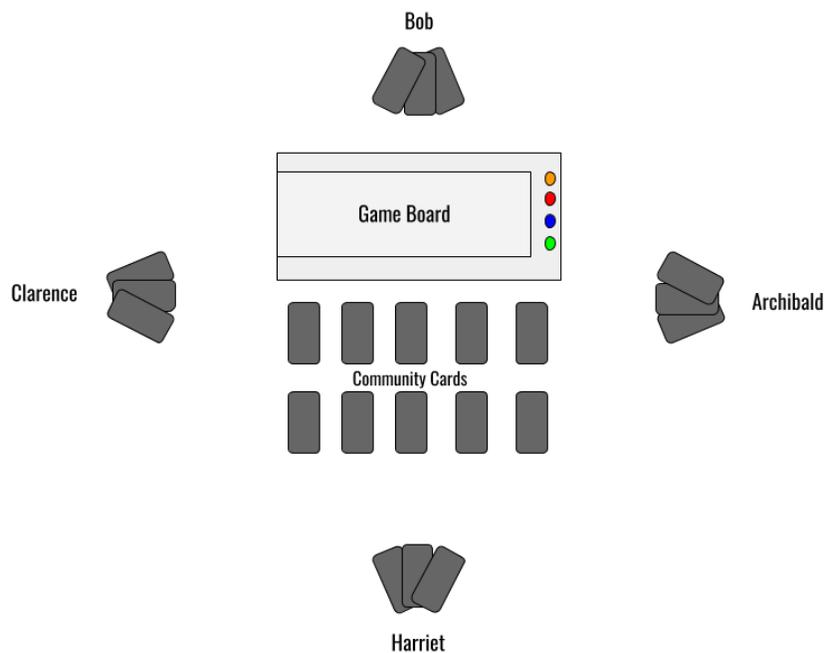
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## Setup

1. Place one of the Game Boards and place it in the center of the table. For your first game, pick the **Infinite Square Well**. Pick out Community Cards as outlined below and place in a grid like that of the Board Game Setup. Feel free to mix and match cards to play with, but for your first game, choose the cards outlined below. Note: All games must include *Wavefunction* and *UV Catastrophe* in the community pile, as these cards are necessary for your starting hand. The other 8 community cards are free to choose.

### a. Infinite Square Well

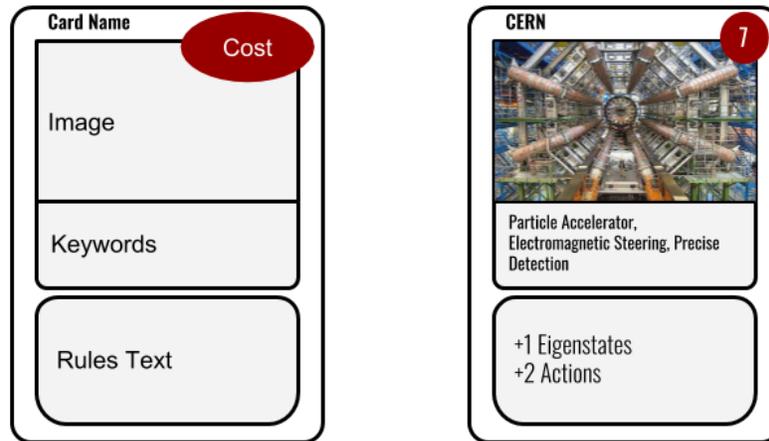
- i. For a quick game to learn the basics choose cards: *Wavefunction*, *UV Catastrophe*, Angular Momentum, Normalize, Hydrogen, Famous Physicist: Lene Hau, Lowering Operator, Raising Operator, Inventions: CERN, Photoelectric Effect
- ii. For a longer game with more complex rules: *Wavefunction*, *UV Catastrophe*, Angular Momentum, Hydrogen, Schrodinger's Cat, Hydrogen, Lowering Operator, Raising Operator, Entanglement, Spooky Action at a Distance



*Beginning of the Game Setup*

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2. Now that the game board is set up, each player should pick a color. Each player should also take two *Wavefunction* and three *UV Catastrophe*. These cards make up your deck. Additionally, each player should take 5 Eigencoins. Shuffle your deck and deal three cards to yourself. These three cards are your starting hand. Each player should now read the card appendix for each card they are playing with.



*Card Design Outline for CERN*

## Glossary

**Eigenstate:** An eigenstate is a line on the gameboard which your pawn can advance up. +1 eigenstate is the same as moving your pawn up one line on the gameboard.

**+X Card:** Draw X cards from your deck. If your deck is empty, draw no cards.

**Action/ +X Actions:** Each player starts the turn with one action. It costs 1 action to play a card. Therefore, playing a card with "+2 actions" allows two cards to be played afterwards.

**Eigencoin:** An eigencoin is a currency used throughout the game. At the end of a person's turn, a player looks at which eigenstate their pawn is at. Then, that player reads how many Eigencoins are taken. Eigencoins are used to buy cards and accumulate over your turns. (I.e. they do not vanish after your turn) When purchasing a card, it costs X Eigencoins, where X is the number on the top right corner of the card.

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## Taking a turn

There are four phases of a turn

- i. **Action Phase, (Playing Cards and Moving Pawns)**
- ii. **Buy Phase**
- iii. **Learn**
- iv. **Reshuffle**

### 1. Action Phase

- i. If you have not done so already, draw three cards from your deck to form your hand. The person with the
- ii. Play cards from your hand one by one. Each card costs one action to play.
- iii. You may continue to play cards as long as you have the necessary actions to play it.
- iv. Any time a card states +1 eigenstate or +2 eigenstates etc. move your pawn up that many lines on the game board.
- v. When you cannot play any more cards (such as running out of actions or running out of cards in your hand), gain the appropriate amount of coins that your final eigenstate suggests. The number of Eigencoins you earn are found to the right of whichever eigenstate you end your turn on.

### 2. Buy Phase

- i. Now that you are done playing cards, look at how many buys you have available. For example, if you end on the 8th eigenstate, you have 2 buys available. Thus, you can purchase 2 cards using any Eigencoins gained both from this turn and before.

### 3. Learning

- When you purchase a card you must learn about it. To do so, look in the cards appendix for the card that you have just purchased and read the description about the card. For example, if I just purchased CERN, I would then read about what CERN is and how it functions.

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Learning is an essential component of the game because it allows you to then teach about that card.

#### 4. Reshuffle

- When all is said and done, you must then reshuffle all cards played this turn, unused cards in your hand and all new cards you have bought. Basically, every card you own should be reshuffled.
- Draw three cards to be ready for your next turn.

#### Winning the game

- ii. Winning the game depends on each game board. For the infinite square well, you must land on the uppermost eigenstate to win the game. After you have done so, you must successfully teach your opponents about two of your cards. If you fail to successfully teach someone, proceed to the buy phase of the turn.
  - **Teaching:** This means that you must teach your opponents about what you have read about the card from the card appendix. If your opponents think you have done an adequate to exceptional attempt at teaching, even if some things were incorrect, you win the game. If your opponents don't believe that you made a fair attempt, earn the associated Eigencoins and wait until your next turn to try again.
  - **Winning with Tunneling:** When using all other game boards except the infinite square well, you may win the game by tunneling. To do so, you must play a tunneling card and successfully tunnel. Like normally, you must still successfully teach two concepts to your opponents.

#### In Summary:

1. Draw 3 Cards
2. Play the cards in your hand. Earn Eigencoins afterwards.
3. Buy cards if you so choose.
4. Reshuffle your cards.
5. Next player.