

Quantum

Games



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Australian Research Council
Centre of Excellence for
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Prof. Tom Stace

School of Maths and Physics
UQ

Quantum Games and Quantum Strategies

J. Eisert, M. Wilkens, M. Lewenstein

(Submitted on 26 Jun 1998 (v1), last revised 29 Sep 1999 (this version, v3))

We investigate the quantization of non-zero sum games. For the particular case of the Prisoners' Dilemma we show that this game ceases to pose a dilemma if quantum strategies are allowed for. We also construct a particular quantum strategy which always gives reward if played against any classical strategy.

Comments: 4 pages, RevTeX, minor changes
Subjects: **Quantum Physics (quant-ph)**
Journal reference: Phys.Rev.Lett.83:3077,1999
DOI: [10.1103/PhysRevLett.83.3077](https://doi.org/10.1103/PhysRevLett.83.3077)
Cite as: [arXiv:quant-ph/9806088](https://arxiv.org/abs/quant-ph/9806088)
(or [arXiv:quant-ph/9806088v3](https://arxiv.org/abs/quant-ph/9806088v3) for this version)

Quantum games and quantum algorithms

David A. Meyer (University of California/San Diego)

(Submitted on 24 Apr 2000 (v1), last revised 3 May 2000 (this version, v2))

A quantum algorithm for an oracle problem can be understood as a quantum strategy for a player in a two-player zero-sum game in which the other player is constrained to play classically. I formalize this correspondence and give examples of games (and hence oracle problems) for which the quantum player can do better than would be possible classically. The most remarkable example is the Bernstein-Vazirani quantum search algorithm which I show creates no entanglement at any timestep.

Comments: 10 pages, plain TeX; to appear in the AMS Contemporary Mathematics volume: Quantum Computation and Quantum Information Science; revised remarks about other quantum games formalisms; for related work see [this http URL](#)
Subjects: **Quantum Physics (quant-ph)**
Cite as: [arXiv:quant-ph/0004092](https://arxiv.org/abs/quant-ph/0004092)
(or [arXiv:quant-ph/0004092v2](https://arxiv.org/abs/quant-ph/0004092v2) for this version)

Multiplayer quantum games

Simon C. Benjamin and Patrick M. Hayden
Phys. Rev. A **64**, 030301(R) – Published 13 August 2001

Article

References

Citing Articles (115)

PDF

Export Citation

ABSTRACT

Recently the concept of quantum information has been introduced into game theory. Here we present the first study of quantum games with more than two players. We discover that such games can possess an alternative form of equilibrium strategy, one which has no analog either in traditional games or even in two-player quantum games. In these "coherent" equilibria, entanglement shared among multiple players enables different kinds of cooperative behavior: indeed it can act as a contract, in the sense that it prevents players from successfully betraying one another.

Gamification

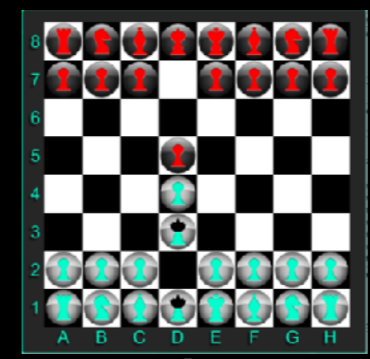
purposeful

Serious Games



no
gameplay

gameplay



quantum chess



Game elements

fun

Games



COMMUNITY

CITIZEN SCIENCE

GAME BASED EDUCATION

QUANTUM RESEARCH

ABOUT US

Physics

Quantum Moves

Play Quantum Moves and contribute to cutting-edge physics research. Your task is to find clever ways of manipulating and moving atoms. By playing, you help physicists in the epic task of building a real quantum computer. This is your chance to push the boundaries of science!



PLAY ON WINDOWS



PLAY ON OSX



PLAY ON LINUX

BACK TO GAMES

Download on the App Store

GET IT ON Google Play

GAME

SCIENCE BEHIND

SCIENTIFIC GOAL

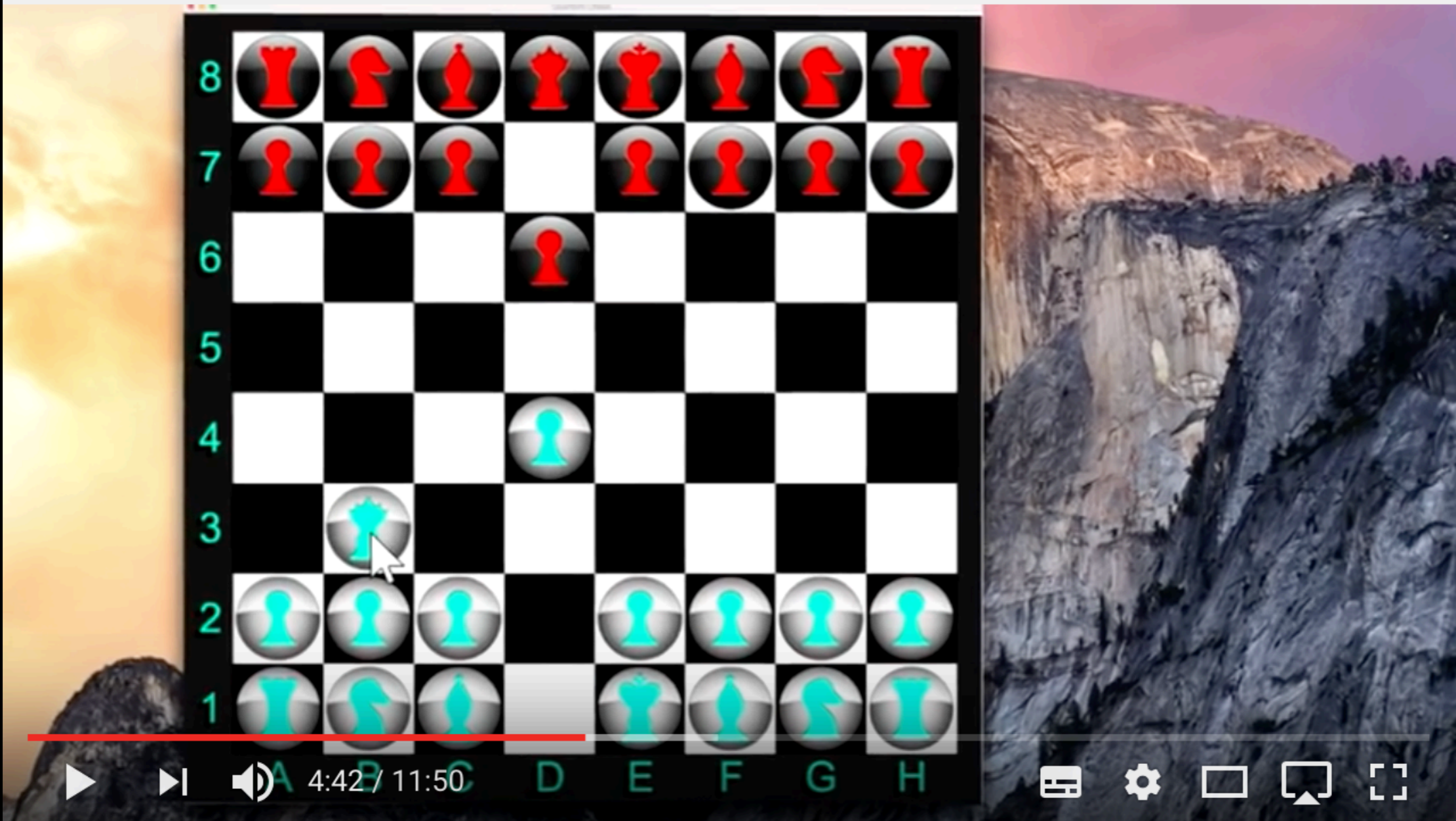
RESULTS

QUANTUM MOVES IN NATURE

Help build tomorrow's

QUANTUM MOVES

Report Problem



Stephen Hawking vs. Paul Rudd in Quantum Chess (feat. Keanu Reeves)



IQIM Caltech

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Game Genres

Adventure

Action

Racing

Sport

Platform

Fighting

Strategy

Simulators

Rhythm

Music

Puzzle

Real World

SCIENTIFIC PARTNERS



DODD-WALLS CENTRE for Photonic and Quantum Technologies

The [Dodd-Walls Centre](#) is a national Centre of Research Excellence involving five NZ universities, hosted by the University of Otago. Our research focuses on New Zealand's acknowledged strength in the fields of precision atomic and quantum optical physics, with our name drawn from two kiwi pioneers in these fields. Our research explores the limits of control and measurement at the atomic scale through the use of laser light, the generation and manipulation of light at its most fundamental, quantum level and the processing and physical nature of information in this quantum realm. The Dodd-Walls Centre also actively promotes science education and outreach to the wider public through partnership with Otago Museum and other organisations nationally.



The [ARC Centre of Excellence for Engineered Quantum Systems](#) unites leading researchers from five Australian universities in building quantum machines that harness the full spectrum of quantum physics.



Quantum Games

GDD Entries in 2016

1. **Q-Puzzle**: destroy a wall with quantum coherence
2. **Quantum non-Demolition Derby**: car game
3. **A walk in their quantum world**: puzzle world
4. **Life of a Scientist**: simulate historical physics discoveries
5. **Big Bang Man**: adversarial puzzle game to break opponents symmetry
6. **Quantum Tricks**: card game with quantum power ups
7. **Quantum Memory**: pair-matching memory game, with spin- J cards.
8. **Quantum Tetris**: Tetris meets quantum physics with superposition, entanglement and collapse of blocks.
9. **Escape from \hbar** : alien race strive to turn the world into an quantum mechanical world; solve quantum puzzles.
10. **Quantum Tycoon**: rise to the top of research ladder to become Quantum Tycoon facing cantankerous reviewers, tardy students, and changes of government?
11. **Quantum Horror / The Zeno Effect**: Escape from the lab safely without being caught by the D-wave Zombies

Competition Summary

★ First prize: \$1500

★ Runner-up: \$500

- 2 September 2019 Submissions open
- 31 January 2020 End date for submissions
- 19 February 2020 Shortlist announced
- 28 February 2020 Shortlisted entries must supply full playable game
- 31 March 2020 Winners announced

details at

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equis.org/games