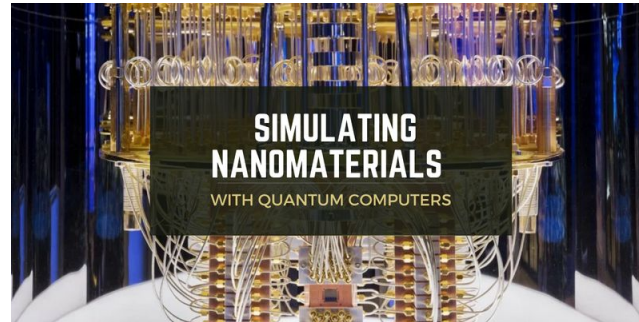
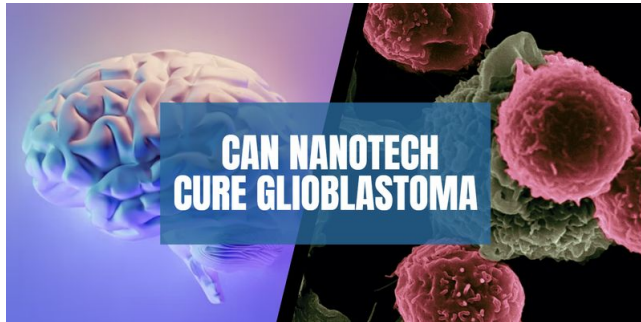
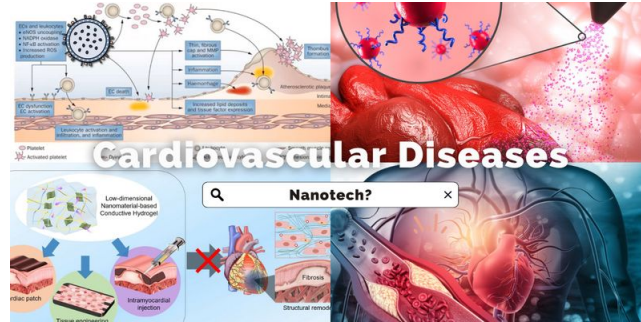


My Nanotech Journey





Quantum simulation of **MOF-5** for
drug-delivery purposes

...ing Inspiration from Virus Hijacking to Improve Drug Nanocarriers

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By Bhavna Kaveti
Reviewed by Susha Cheriyedath, M.Sc.

Nanomedicine involves nanoscale therapeutics and dia
targeting capability to these novel systems increases
targeted transport of nanomedicines is often obstr
in the body.

Cancer Brain Cancer Drug Discovery Drug Delivery Nanotechnology News Pediatric Diseases

Nanoparticles Target Medulloblastoma Tumor to Improve Drug Therapy and



nature biotechnology

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News & Views | [Published: 30 March 2023](#)

Drug delivery

CRISPR editing in the lung with novel lipids

[Uri Elia](#), [Edo Kon](#) & [Dan Peer](#) ✉

[Nature Biotechnology](#) (2023) |

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Global Novel Drug Delivery Systems (NDDS) Market Research Report 2023: A \$ Billion Market by 2030 - Nanotechnology Bolsters Demand

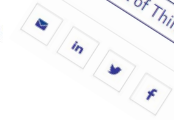
PR Newswire
May 10, 2023

...wire/ -- The "Novel Drug Delivery Systems (NDDS): Global
...port has been added to [ResearchAndMarkets.com](#)'s offering.
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IoT innovation: Leading companies nanoparticles for drug delivery

Premium Insights | February 14, 2023

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Internet of Things



TRENDING

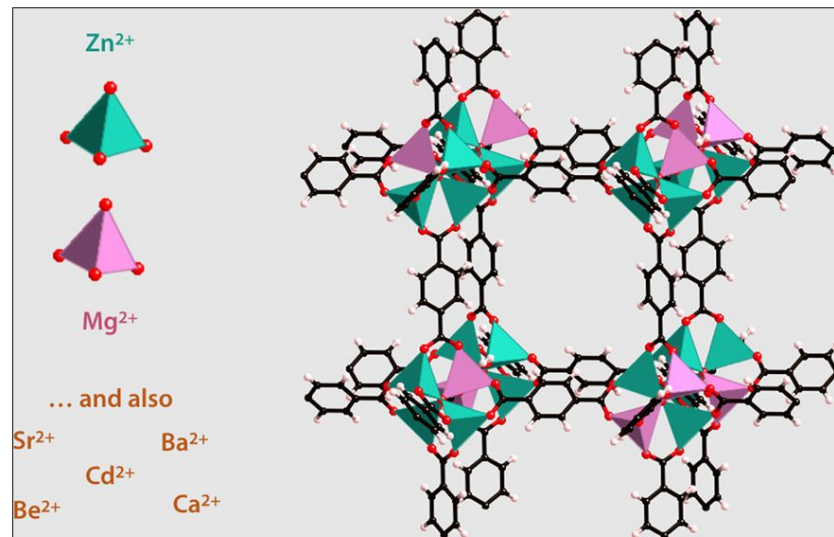
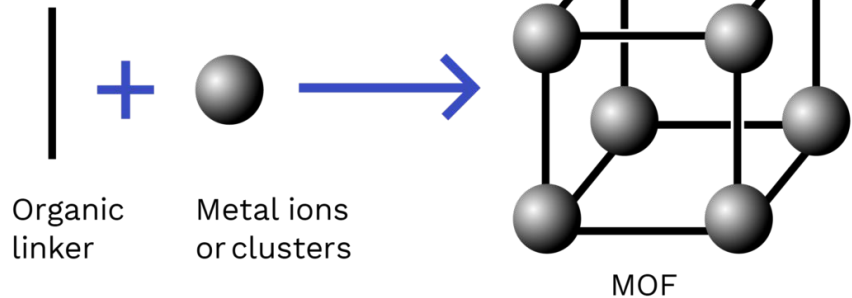
1. Fed's Bullard calls for two more rate hikes in 2023
2. Supreme Court won't hear dispute over California law barring sale of foie gras
3. IMF sees slower Dominican Republic growth at 4% in 2022

Quote Lookup

The background of the slide is a dark, almost black, field filled with intricate, swirling patterns of vibrant green. These patterns resemble marbled paper or perhaps a microscopic view of a biological tissue, with various shapes like spirals, loops, and elongated forms. The green has a slightly grainy, digital texture. Centered in the middle of this background is the text 'The Problem: Toxicity'.

The Problem: Toxicity

MOF - 5



MOF-5 and Toxicity

MOF	Toxicity
MIL-53, MIL-88, MIL-89, MIL-100, MIL-101	low toxicity
UiO-66, UiO-67	low toxicity
Zr-fum	low toxicity
MOF-74 (Mg, Co, Ni)	low to no toxicity
MOF-74 (Cu, Mn, Zn)	high toxicity
ZIF-7	low toxicity
ZIF-8	low to high toxicity
MOF-5	high toxicity
NOTT-100	high toxicity
HKUST-1	highly toxic

A man with glasses and a beard, wearing a grey hoodie, is seated at a desk in a control room. He is looking at a large monitor displaying a 3D simulation of a blue structure. The room is dimly lit with blue ambient lighting. Other monitors in the background show various data visualizations, including a line graph. The text "Classical simulation" is overlaid in white on the image.

Classical simulation

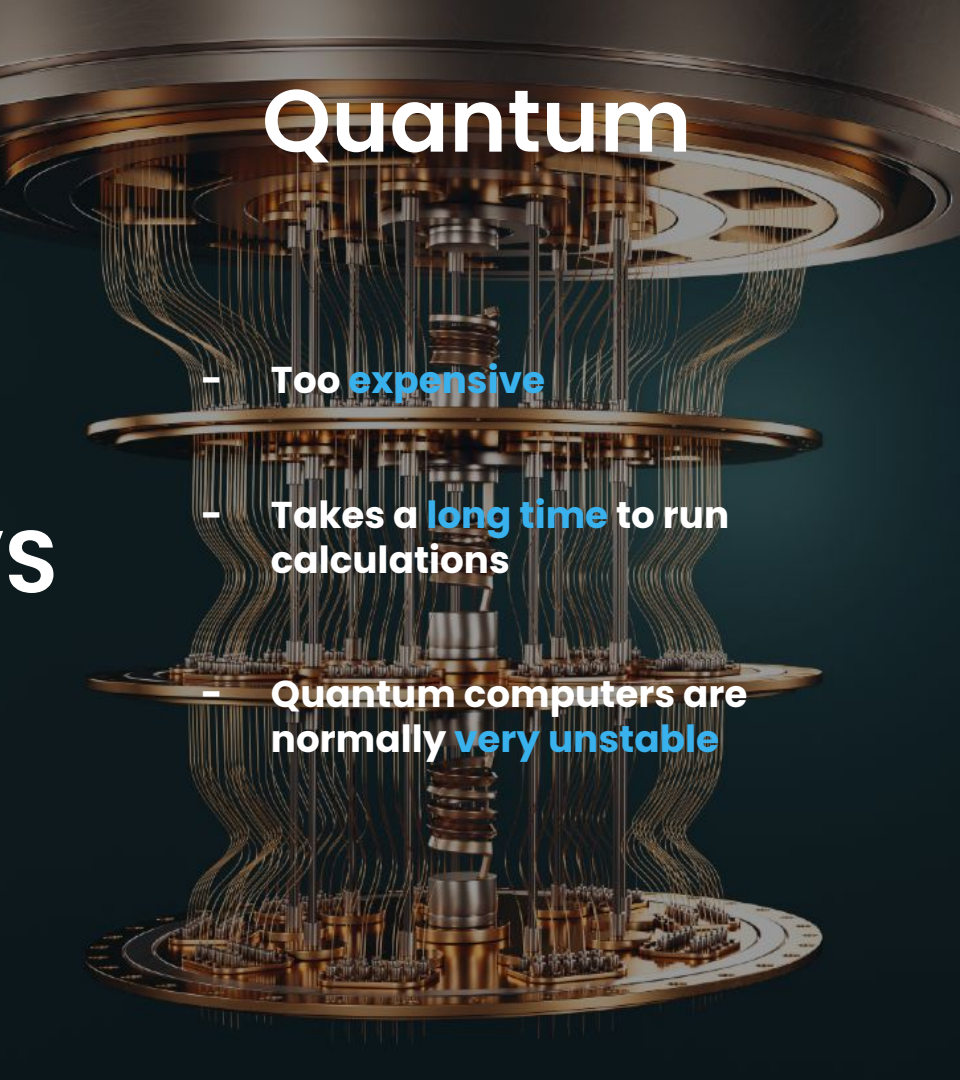
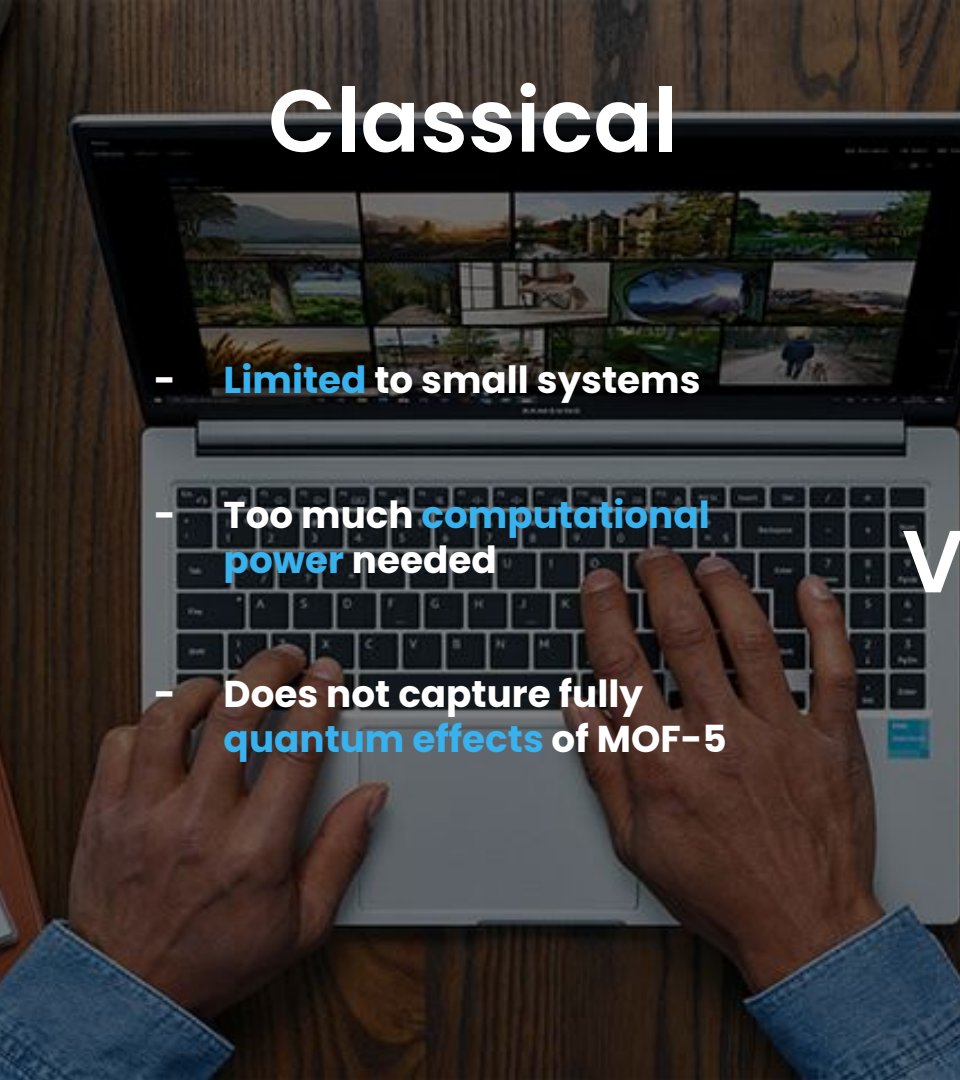
Classical

- Limited to small systems
- Too much computational power needed
- Does not capture fully quantum effects of MOF-5

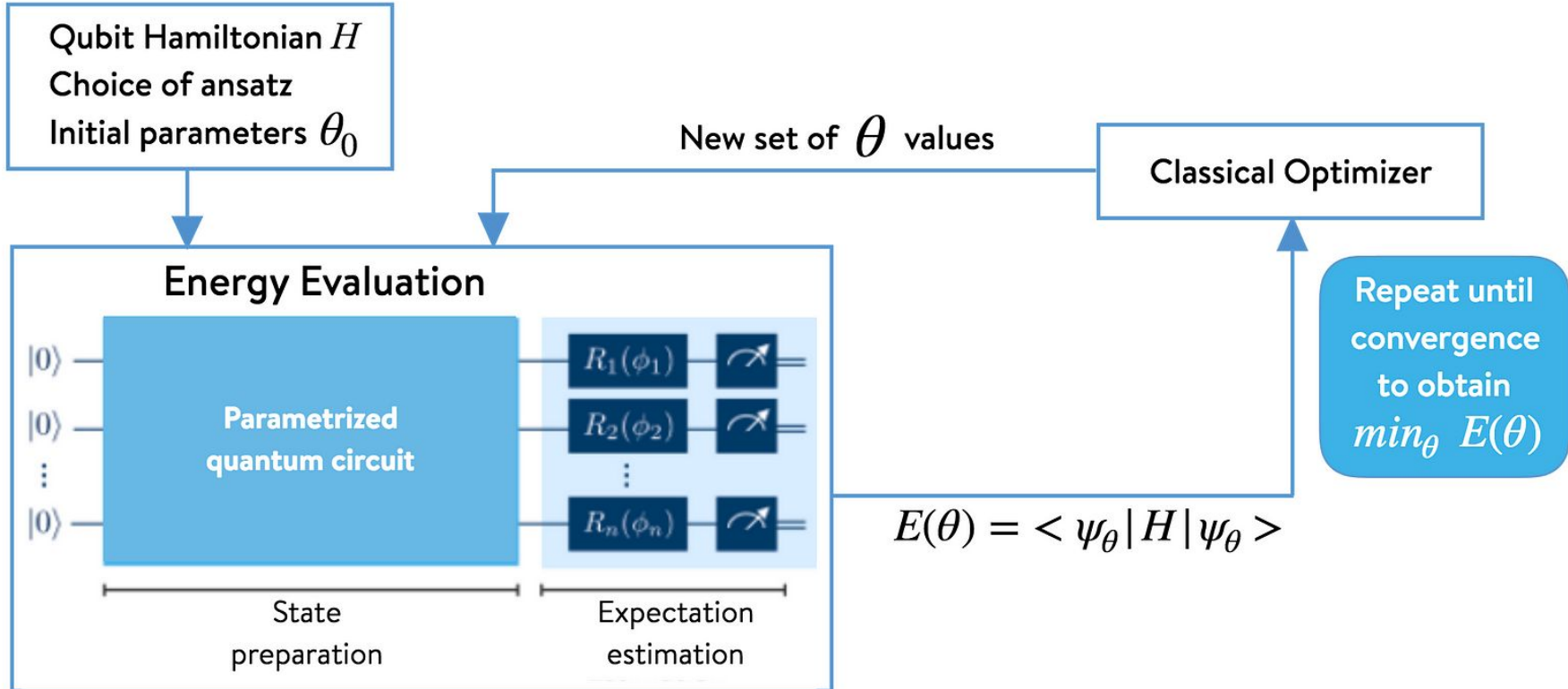
VS

Quantum

- Too expensive
- Takes a long time to run calculations
- Quantum computers are normally very unstable



VQE - The Solution



A proof of concept using Hydrogen

$$H = 0 \cdot II + 0.5 \cdot XX + 0.5 \cdot ZZ + 0.5 \cdot YY.$$

None ▾

The exact ground state energy is: -1.5

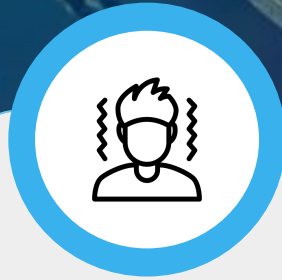
The estimated ground state energy using VQE algorithm is: -1.5

The optimal parameter theta is : 3.145432887706873

The impact to drug delivery



Personalised drug design which could make it less dangerous



Reduced side effects because of toxic nanoparticles in the body



More time efficient at delivering the drug / reduced cost

Thank You



Amanda Hall - CEO of Summit Nanotech

“Nanotechnology has various applications in the modern era, material simulation being one of them. Toxicity is definitely a massive issue in this area and with Vivek’s idea, it could revolutionise drug delivery completely. ”

