

Can IonQ be used for lithium-air batteries?

Now IonQ aims to use quantum computing to analyze and simulate the structure and energy of lithium compounds for Hyundai's batteries, including lithium oxide in lithium-air batteries. "Lithium-air batteries have a higher energy density than lithium-sulfur batteries and thus have more potential power and capability," Chapman says.

Can quantum computers design advanced batteries for electric vehicles?

Charles Q. Choi is a contributing editor for IEEE Spectrum. Hyundai is now partnering with startup IonQ to see how quantum computers can design advanced batteries for electric vehicles, with the aim of creating the largest battery-chemistry model yet to be run on a quantum computer, the companies announced yesterday.

What is a quantum battery?

Shortly afterwards, an influential study of energy storage and transduction at the nanoscale pioneered the concept of a quantum system storing and releasing energy on demand: a quantum battery [3,4]. An archetypal quantum battery model consists of two parts, the battery holder and the battery charger.

Can quantum batteries outperform classical batteries?

Designing quantum batteries able to outperform the classical ones requires a balance of fast charging, durable storage and effective work extraction. With their theoretical model, the authors propose a quantum battery with quadratic driving which induces plentiful useful work near to certain critical points.

Are quantum batteries able to exploit quantum advantages?

Proposing optimal designs of quantum batteries which are able to exploit quantum advantages requires balancing the competing demands for fast charging, durable storage and effective work extraction.

Is a bipartite quantum battery a driven-dissipative open quantum system?

Here we study theoretically a bipartite quantum battery model, composed of a driven charger connected to an energy holder, within two paradigmatic cases of a driven-dissipative open quantum system: linear driving and quadratic driving.

Chinese scientists achieve quantum communication breakthrough . According to the University of Science and Technology of China (USTC), important new progress has been made in the research of quantum communication and quantum networks. Taking advantage of high-quality entangled photon pair sources, scientists have realized long-distance quantum ...

Here we study theoretically a bipartite quantum battery model, composed of a driven charger connected to an energy holder, within two paradigmatic cases of a driven ...

Unlike chemical batteries that rely on materials like lithium, quantum batteries use tiny ... Rizwan Choudhury
Rizwan is a writer and journalist with a background in Mass ...

Nature Communications - Lithium sulfur batteries are promising for next-generation energy storage, but are hindered by polysulfide shuttle effects. Here the authors use black phosphorus quantum ...

The Fraunhofer Institute for Manufacturing Technology and Advanced Materials (IFAM) has unveiled a groundbreaking method combining quantum sensors and artificial intelligence (AI) ...

6 ???· An interdisciplinary project team has taken on the scientific objective of determining the residual power and remaining service life of used lithium-ion batteries in a non-destructive, fast ...

Communications Physics - Designing quantum batteries able to outperform the classical ones requires a balance of fast charging, durable storage and effective work extraction. With their theoretical...

2 ???· Lithium-ion batteries degrade over time, losing capacity and increasing internal resistance. A assessing a battery's State-of-Health (SoH), which indicates how much a battery has aged, requires time-consuming electrochemical measurements. These traditional methods cannot identify localized defects or charging hotspots.

An accurate battery model is of great importance for battery state estimation. This study considers the parameter identification of a fractional-order model (FOM) of ...

Herein, MoS₂ quantum dots (QDs) are constructed to serve as electrolyte additives for lithium-sulfur batteries, which can "solidify" soluble polysulfides by chemisorption ...

A pressing need for enhancing lithium-ion battery (LIB) performance exists, particularly in ensuring reliable operation under extreme cold conditions. All-solid-state batteries (ASSBs) offer a ...

PRESS RELEASE -- IonQ (NYSE: IONQ), a leader in trapped-ion quantum computing, and Hyundai Motor Company today announced a partnership to develop new variational quantum eigensolver (VQE) algorithms ...

Quantum batteries are devices that use quantum effects to leverage enhanced efficiencies over conventional battery technologies. While research into these fascinating systems is still in its infancy, quantum batteries are poised to ...

Rapid communication. V₂O₅ quantum dots/graphene hybrid nanocomposite with stable cyclability for advanced lithium batteries. Author links open overlay panel Chunhua Han a 1, Mengyu Yan a 1 ... Ti₃C₂ MXene-derived Li₄Ti₅O₁₂ nanoplates with in-situ formed carbon quantum dots for metal-ion battery anodes. Journal of Colloid and ...

In this work, we provide a detailed answer to the following question: how can a quantum computer be used to simulate key properties of a lithium-ion battery? Based on ...

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Web: <https://www.batteryhqcenturion.co.za>