中央研究院關鍵議題研究中心

成立宗旨

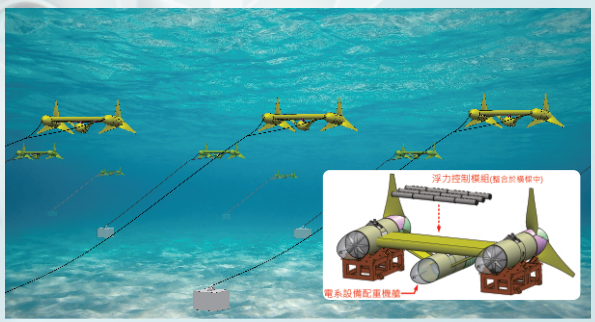
中央研究院為協助國家社會因應重大挑戰，以具世界級競爭力之研發成果，提出關鍵問題解方，於2024年1月成立關鍵議題研究中心。以下簡稱關鍵中心。

(Research Center for Critical Issues, RCCI)

711010
台南市歸仁區歸仁十三路100號
中央研究院 關鍵議題研究中心
E-mail: chunfang@gate.sinica.edu.tw

關鍵議題研究計畫

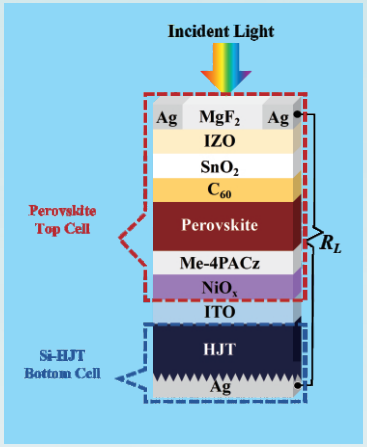
關鍵中心強調以團隊型的專題中心與研究計畫，執行符合國家政策或對社會具重大影響的前瞻性研究，以運用科研成果協助解決國家社會之關鍵議題為目標。本院目前選定「淨零科技」與「量子科技」兩個領域的專題中心與研究計畫加入關鍵中心。



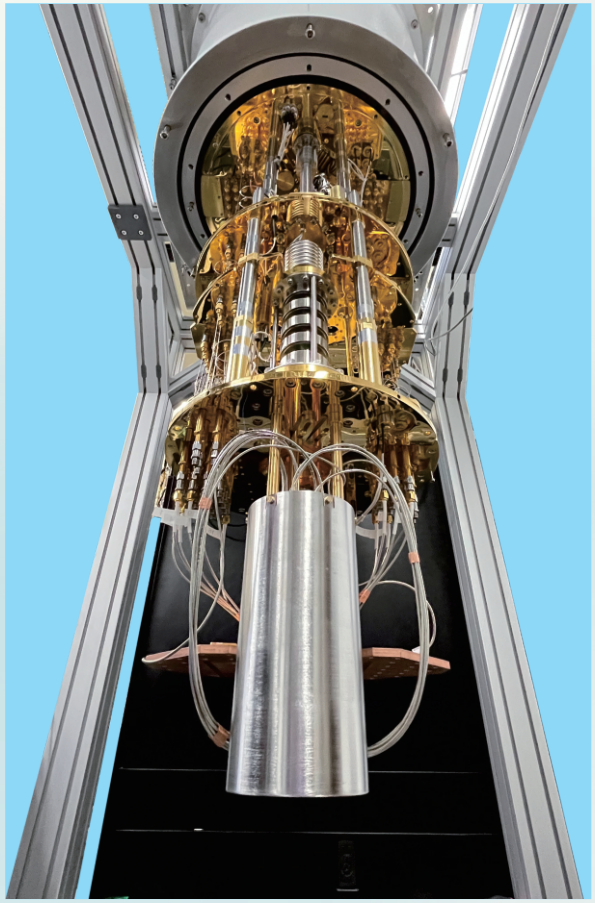
洋流發電機與海中的發電機陣列示意圖

在淨零科技方面，現有「海洋能專題中心」與「次世代太陽能電池研究計畫」進駐。「海洋能專題中心」著重於黑潮海流發電、海藻減碳等項目。目前已完成二次黑潮船測，並且開始建造100 kW洋流發電機。

「次世代太陽能電池研究計畫」以大面積、高效能的鈣鈦礦－矽疊層太陽能電池為主要研發方向，除了要將效率提升至接近30% 外，也將會投入自動化製程研發。



鈣鈦礦－矽疊層太陽能電池結構示意圖



超導量子晶片運作用的稀釋冷凍機

在量子科技方面，現有「量子電腦專題中心」與「量子光電研究計畫」進駐，設立無塵室與測試實驗室。「量子電腦專題中心」將發展通用量子電腦的原型機，進行初步的量子運算，並研發相關次系統，包括高速數位控制電路以及Cryo-CMOS元件等。 「量子光電研究計畫」的研究主題則包括開發高效率、高亮度、具光子不可分辨性的單光子發射器，以及高靈敏度、快速反應的超導單光子偵測器等。這些研發與未來的量子科技產業息息相關。

Research Center for Critical Issues, Academia Sinica

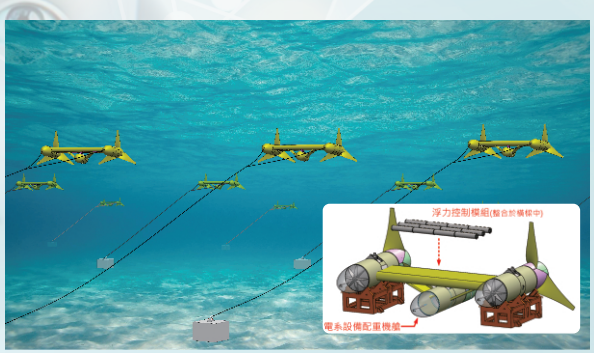
Objective

In January 2024, Academia Sinica established the Research Center for Critical Issues (RCCI) to assist the nation and society in addressing major challenges, by providing world-class R&D solutions to critical problems.

Research Center for Critical Issues,
Academia Sinica, No. 100, Section 1,
Guiren 13th Road, Guiren District,
Tainan City 711010, Taiwan
E-mail: chunfang@gate.sinica.edu.tw

Research Programs on Critical Issues

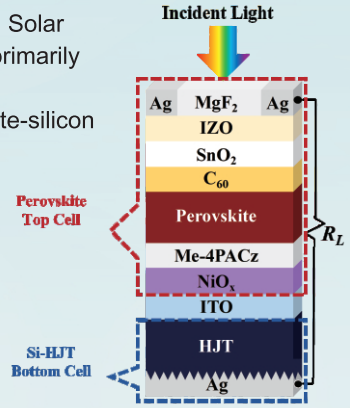
RCCI emphasizes team-based thematic centers and research projects to conduct forward-looking research that aligns with national policies or has significant social impact. The goal is to apply research outcomes to help solve the nation's or society's critical issues. Academia Sinica has selected two research areas, "Net-Zero Technology" and "Quantum Technology", to establish thematic centers and projects within RCCI.



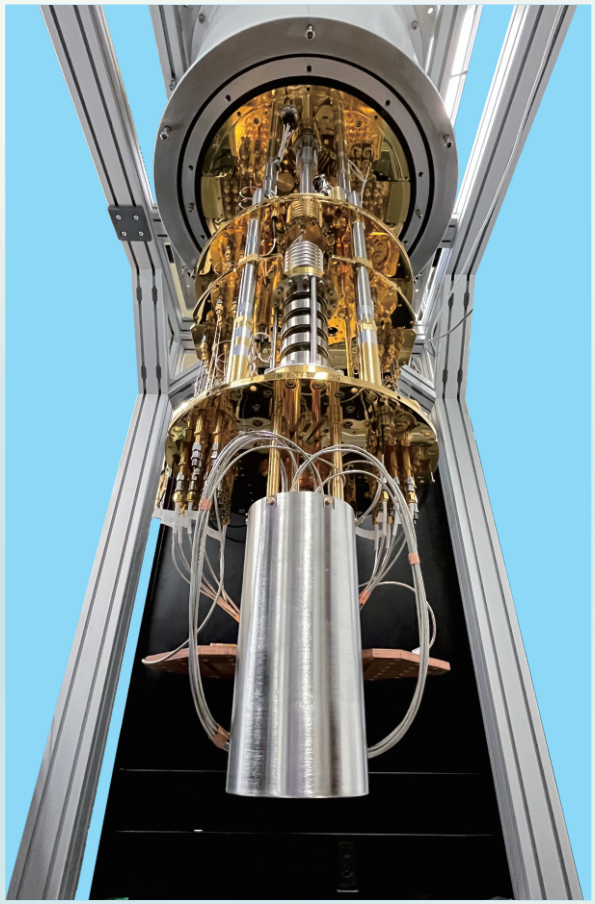
Schematics of the ocean-current power generator and the subsea power generation array.

In the Net-Zero Technology domain, the "Thematic Center for Marine Energy" and the "Next-Generation Solar Cell Research Project" are housed in RCCI. The Thematic Center for Marine Energy focuses on projects such as Kuroshio Current power generation and seaweed carbon sequestration. Two Kuroshio Current measurement surveys have been completed, and researchers are constructing a 100 kW ocean-current power generator.

The Next-Generation Solar Cell Research Project primarily develops large-area, high-efficiency perovskite-silicon tandem solar cells. In addition to targeting an efficiency close to 30%, the project will also invest in automated manufacturing process development.



Schematic of the structure of a perovskite-silicon tandem solar cell.



Dilute refrigerator for superconducting quantum chips

In the Quantum Technology domain, the "Thematic Center for Quantum Computer" and the "Quantum Photonics Research Project" are currently housed, with the establishment of a clean room and testing laboratories. The Thematic Center for Quantum Computer develops prototypes of general-purpose quantum computers, conducts preliminary quantum computations, and develops related subsystems, including high-speed digital control circuits and Cryo-CMOS devices. The Quantum Photonics Research Project's topics include developing high-efficiency, high-brightness, photon-indistinguishable single-photon emitters, as well as high-sensitivity, fast-response superconducting single-photon detectors. These R&D efforts are essential for the future quantum technology industry.