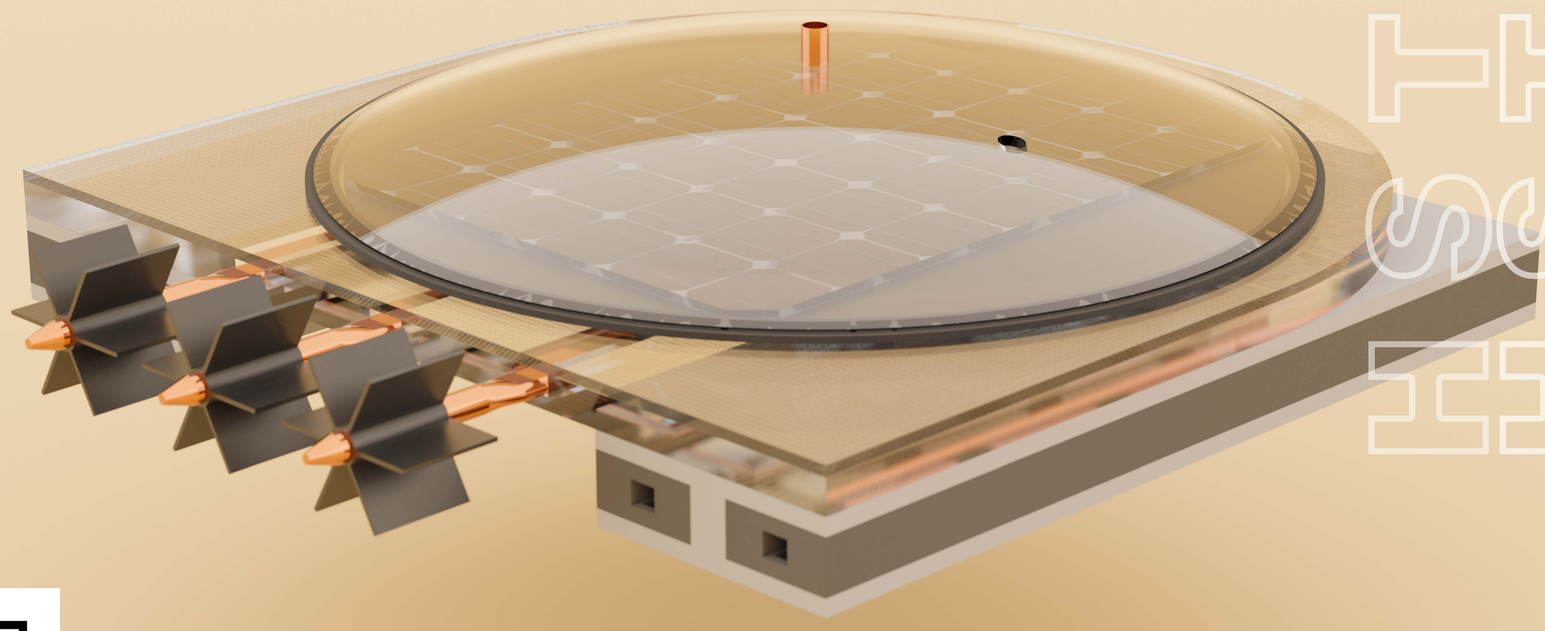

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DEVELOPMENT AND EVALUATION OF A HYBRID SOLAR-THERMOELECTRIC POWER GENERATION SYSTEM IN A MARINE ENVIRONMENT AND USAGE OF HYDRODYNAMICS PROPULSION

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ABSTRACT

In this study, the development and evaluation of a novel maritime floating Hybrid Energy Harvesting system that integrates Solar-Thermoelectric Generation and Magnetohydrodynamic (MHD) propulsion is presented. The proposed Hybrid-Solar-Thermoelectric with Magneto-Hydrodynamic Propulsion (HSTM) system provides an innovative solution for sustainable energy production and eco-friendly transportation in maritime environments, while optimizing power generation and cost efficiency. The hybrid energy harvesting system features a monocrystalline solar panel and a series of thermoelectric generator (TEG) modules placed beneath the solar panel. The solar panel and TEGs are enclosed within a vacuum glass dome, which helps maintain optimal temperatures for thermoelectric conversion efficiency. The MHD propulsion device is integrated under the system's platform, utilizing a ferromagnetic profile and a series of neodymium magnets arranged to face each other with opposing poles. Comprehensive performance analysis of the hybrid energy harvesting system includes power output measurements, evaluation of the MHD propulsion efficiency, and optimization of magnet distance and power production temperature. The results demonstrate that the system not only increases the overall energy generation efficiency compared to standalone solar panels, but does so without incurring excessive costs. Furthermore, the study confirms the viability of MHD propulsion in a maritime environment, contributing to the ongoing research and development of innovative solutions for sustainable energy production and green transportation in the sea.

THE RESEARCH QUERY STEERING THIS PROJECT IS:

How can we take advantage of the solar heat energy to boost energy production efficiency of solar power generation systems using TEGs in a maritime environment and optimize the design of MHD propulsion systems for floating structures.