

Laser replaces solar power generation

What is a solar pumped laser?

Solar-pumped lasers (SPLs), which convert sunlight into laser radiation, are of interest for applications, such as solar hydrogen generation, remote area telecommunications, space propulsion, space solar power systems, and high-efficiency photovoltaic energy conversion 1,2,3,4,5,6,7,8.

What is a 20 kW solar panel laser?

The laser is a CW high-energy Yb-doped fiber laser emitting at a center wavelength of 1075 nm with $\sim 1 \text{ m}^2$ of effective beam area. For 20 kW illumination of a solar panel having 0.6 m^2 of area, optical simulations and thermal simulations indicate an electrical output power of 3000 W at a panel temperature of 550 K.

Can sunlight be converted into laser light?

Broadband sunlight can be converted into laser light by solar pumping, which can be a source of narrowband, collimated, rapidly pulsed radiation--with the possibility of extremely high brightness and intensity.

What is a solar pumped laser (SPL)?

Communications Physics 3, Article number: 60 (2020) Cite this article A solar-pumped laser (SPL) that converts sunlight directly into a coherent and intense laser beam generally requires a large concentrating lens and precise solar tracking, thereby limiting its potential utility.

Should semiconductor laser arrays be replaced with solar-pumped solid-state lasers?

Two significant shortcomings of semiconductor laser arrays are performance degradation over time and a limited lifespan--and seem to scale with the level of average output power. Replacing semiconductor laser arrays with direct solar-pumped solid-state lasers "shows potential to overcome these limitations," says Liang.

What can a solar laser be used for?

The team's solar laser may find wide-ranging applications such as earth, ocean, and atmospheric sensing, laser beaming, deep space communications, and space debris removal.

laser scribes to reach higher power conversion efficiencies. This comprehensive review of laser scribing of photovoltaic solar thin films pivots on scribe quality and analyzes the critical ...

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A sunlight-powered laser could be used instead of fossil fuels to kickstart chemical processes for the energy-intensive production of fertiliser, the scientists say. Conventional lasers are powered by electrical energy from a ...

Lasers offer several advantages for improving solar cell efficiency and lowering manufacturing costs. Through a process called laser-induced texturing, precise microscopic textures are created on cell surfaces to ...

A space solar power system (SSPS) is a next-generation energy technology that converts solar energy into laser light or microwaves on a geostationary satellite orbiting the Earth, transmits it to the ground, and uses it ...

3 ???· The solar-powered laser system being developed under the APACE project could enable power to be sent via satellite, offering new opportunities for space missions. Courtesy of WikiImages via Pixabay. The team will begin by ...

The use of space for power generation is strongly recommended because it offers highest energy conversion efficiency sinking the heat as an energy dissipation makes best use ...

For instance, a solar power satellite with laser transmission capability can operate in a lunar polar orbit and provide power supply to exploration programs in polar regions on the moon," he said.

Back-contact silicon solar cells, valued for their aesthetic appeal because they have no grid lines on the sunny side, find applications in buildings, vehicles and aircraft and ...

Space-based solar power (SBSP) is an idea that has been alternatively promoted and ignored since its inception in 1968. An SBSP system is basically a satellite comprised of solar panels transmitting electric energy ...

2. Space-based solar laser system model A space-based solar laser system on a space station rotating in an orbit around the earth is modelled. The Figure 1. A sketch of the space-based ...

A solar-powered laser enjoys far greater system simplicity, and benefits from a nearly eternal and free pump source. Overall, this study lights a way to take solar-powered lasers to new heights, with a clear blueprint for high ...

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