Solar focusing optical system design

How can solar concentrator optics improve cost effective PV technologies?
In order to make the necessary leaps in solar concentrator optics to efficient cost effective PV technologies, future novel designs should consider not only novel geometries but also the effect of different materials and surface structures.

What are the trends in solar concentrator design?
Trends towards higher performance solar concentrator designs include the use of micro-patterned structures and attention to detailed designsuch as tailoring secondary optics to primary optics and vice-versa.

How will space solar-concentrator optics work?
Plans for space solar-concentrator optics,which would direct light toward solar fields on Earth,consist of a lightweight array of heliostat mirror satellites in a constellation in low Earth orbit (1000 km). Although this may seem far-etched,NASA is developing a solar sail due to be finished by 2015.

What makes a good solar concentrating optical system?
The ideal solar concentrating optical system would have 100 % optical efficiency,an output of uniform irradiance distribution (matching in shape and size to the PV receiver),maximum acceptance angle,high optical tolerance,and durability (hence high reliability). It would also preferably be cheap to manufacture,lightweight,and easy to install.

Can a Fresnel lens be used for a solar concentrator?
Concept and design of modular Fresnel lenses for concentration solar PV system Winston Roland, Ritschel Alexander. Concentrating photovoltaic system using a Fresnel lens and non-imaging secondary optics. US Patent application publication; 2008. p.US2008/0245401. Schwartzman Zalman. Solar concentrator device for photovoltaic energy generation.

Are solar concentrators durable?
Conclusion An extensive review of solar concentrator research and technologies has been carried out,comparing different materials and the optical performance of different designs. There is not enough considerationinto the durability of designs and their performance over years of use,especially for concentrators utilising refractive optics.

In this paper, we presented a simulation method to assess and evaluate the performance of a simple optical design composed of a split spectrum combined with a solar ...

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The numerical aperture (NA) of objective lens optical (inspection) systems has been increased to achieve higher resolution. However, the depth of focus decreases with an ...

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The two-stage line-to-point focus solar concentrator with tracking secondary optics is introduced. Its design aims to reduce the cost per m 2 of collecting aperture by maintaining a one-axis ...

This article reviews the state of the art in optical design, modeling and characterization of solar central receiver systems.

Optical properties, durability, and system aspects of a new aluminium-polymer-laminated steel ...

Optical properties, durability, and system aspects of a new aluminium-polymer-laminated steel reflector for solar concentrators. Solar Energy Materials & Solar Cells Vol. 82, pp 387-412

The two-stage line-to-point focus solar concentrator with tracking secondary optics is ...

In this paper, we presented a simulation method to assess and evaluate the performance of a simple optical design composed of a split spectrum combined with a solar concentrator, both ...

In concentrating solar thermal systems, optical concentrators are used to obtain radiative fluxes ... A beam-down solar concentrator with a fixed focus -- Design and ...

Optical System Design of Solar Blind Ultraviolet Imaging Detector . ¹Zhang Yunfei ²WuTian . 1. State Grid Jiangsu Electric Power Company, JiangSu, Xuzhou, 221000 . 2. ...

This paper would review and survey the progress in the last 30 years including the optical design and development in the optics of solar concentrators for the CPV system. ...

A novel two-stage dish solar concentrator with a fixed focus is designed. o The optical performances are determined by ray-tracing under a new sun-tracking mode. o The ...

Point-focusing optical concentrators, including solar dishes and central receiver systems (CRSs), provide higher concentration ratios in the range of 500-10,000 suns than the ...

A comprehensive explanation based on numerical simulation using ray tracing with realistic irradiation conditions is presented to demonstrate the possibility of employing a ...

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