

Scientific Achievement:
A Scheffler optical concentrator was geometrically modelled and ray-tracing analysis was performed to obtain input power to the receiver. A novel cavity-air-receiver with porous absorber was subjected to CFD and CHT analysis for design optimization.

Significance and Impact:
A simplified model assuming a 2D steady-state axisymmetric model of the cavity receiver is analyzed by modelling using the commercially available ANSYS FLUENT software package.

Research Details:
• Ray tracing analysis of the Scheffler concentrator was carried out using Monte Carlo simulation implemented in TracePro software.
• Novel cavity-air-receiver with the flexibility of using steel and SiC porous media in the flow domain.
• Constant heat flux is assumed on the cavity surface. Loss modelling of the receiver involves natural convection loss and re-radiation from the cavity receiver. A Fluent UDF script was used for the same.
• Porous medium thermal model is assumed to be Local Thermal Equilibrium model.


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