

Abstract Submitted
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A Monte Carlo Model for Luminescent Solar Concentrators ALEX MOONEY, PAUL FONTECCHIO, BRUCE WITTMERSHAUS, School of Science, Pennsylvania State University: Erie, The Behrend College — Luminescent Solar Concentrators (LSCs) offer an inexpensive alternative for solar power generation. A LSC is a flat, translucent plate that absorbs sunlight through embedded, highly fluorescent chromophores. The emitted light is concentrated via total internal reflection at the edges of the LSC, where photovoltaic cells convert it into electricity. We've developed a Monte Carlo model that predicts the properties of LSCs by tracing individual light rays. The user controls the plate's geometry and spectral properties, along with the spectral profile of the excitation source. The user can include a specular or diffuse reflective background under the LSC. We've demonstrated the ability to predict the output of a LSC as a function of its optical density. Reabsorption distorts the profile of fluorescence as light propagates through a LSC, and the program can accurately reproduce the effect. The goal is to use the model as a predictive tool for improving the design of LSCs.

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