Advances in high-concentration solar thermal optics using the SMS method

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Abstract

Throughout the recent years, the solar thermal concentration field has remarkably increased its relevance due to its wide range of applications, such as electricity production (Concentrated Solar Power), desalination, solar cooling, etc. Nevertheless, from an optical point of view, few progresses have been made. In fact, the great majority of the concentrators used are imaging optics which fall short from the theoretical limits of concentration and, therefore, there is a large room for improvement in this particular subject.

Nonimaging optics (NIO) can be used to overcome this difficulties since this type of optics are much closer to the limits of concentration. In particular, the Simultaneous Multiple Surface (SMS) method can be used to design such concentrators and increase the overall competitiveness of this systems.

In this presentation a XX SMS concentrator for tubular receivers is presented. A comparison with the most popular concentrator nowadays, the Parabolic Trough (PT) concentrator, is presented to in order to test the merits of this new optic. For a sake of completeness, a comparison with the Helmet SMS concentrator is also presented.