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Sommario/riassunto	Primary and secondary solar concentrators are of vital importance for advanced solar energy and solar laser researches. Some of the most recent developments in primary and secondary solar concentrators were firstly presented. A novel three-dimensional elliptical-shaped Fresnel lens analytical model was put forward to maximize the solar concentration ratio of Fresnel-lens-based solar concentrators. By combining a Fresnel lens with a modified parabolic mirror, significant improvement in solar laser efficiency was numerically calculated. A fixed fiber light guide system using concave outlet concentrators was proposed. The absence of a solar tracking structure highlights this research. By shaping a luminescent solar concentrators in the form of an elliptic array, its emission losses was drastically reduced. Simple conical secondary concentrator was effective for thermal applications. New progresses in solar-pumped lasers by NOVA University of Lisbon were presented. By adopting a rectangular fused silica light guide, 40 W maximum solar laser power was emitted from a single Ce:Nd:YAG rod. An aspheric fused silica secondary concentrator and a small diameter Ce:Nd:YAG rod were essential for attaining 4.5 % record solar-to-laser power conversion efficiency. A novel solar concentrator design for the efficient production of doughnut-shaped and top-hat solar laser beams were also reported. More importantly, a novel solar concentrator approach for the emission of 5 kW-class TEM00 mode solar laser

beams from one megawatt solar furnace was put forward at the end of this book, revealing promising future for solar-pumped lasers.