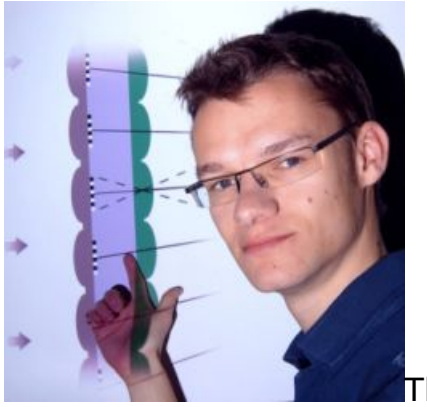
Mini-projectors – maximum performance



The number of mini-projector devotees keeps growing. The combination of a new kind of optical structure with high-performance LEDs enables completely new compact and brilliant lighting and projection systems.

Almost no public presentation today is made without projectors. As the years pass, these devices keep getting smaller – and handier. A market with immense growth potential: According to estimates, by 2012 up to 45 million units are expected to sell worldwide. Important: The miniature projectors have to deliver sharp contrasts and clear colors. In his thesis project, „Design and realization of an ultraslim array projector," Marcel Sieler of the Fraunhofer Institute for Applied Optics and Precision Engineering IOF in Jena developed the bases for an entirely new kind of design in order to realize mini-projectors. In recognition of this, he is awarded the 1st Hugo Geiger Prize.

In all current systems of pocket projectors, a single imaging channel is used. This means a minimal size for the projector is a given – and smaller will not work. Except for Marcel Sieler: His construction method relies on a number of regularly ordered micro-lenses – an array – as the projection lens. Thanks to the many channels, the construction length of the entire system can be clearly reduced, without impeding luminosity. A high-performance LED is used as the light source.

In order to achieve this result, in his thesis project, Sieler initially tested and adapted the theoretical basis for the construction of a micro-lens array. He then devised a corresponding system that was characterized in laboratory experiments and tested for its optical performance capacity. Within nine months, Marcel Sieler transformed his idea into the first prototypes. With these, he could display the immense potential of the concept with which both static as well as mobile image contents can be projected. This project required competence in optical design, in microsystem technology - as well as in project management, strength of purpose and personal commitment. Based on Marcel Sieler‘s work, the Fraunhofer-Gesellschaft was able to apply for a basic patent for this new kind of optical system.

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