

## Device for generating ion beams with adaptable ion beam profiles

free-form optics, ion beam sputter deposition, coating, ion beam etching

### DESCRIPTION OF TECHNOLOGY

Ion sources provide a directed ion beam. In the case of ion sources for material processing, this ion beam is used to process a material by exposing it to the ion beam. The use of a common static extraction system in lattice ion sources and lattice ion thrusters limits the application range of these sources. In this novel ion source, the arrangement of the extraction apertures of individual gratings as well as the distances between the individual gratings of an extraction grating system can be continuously changed. The beam profile achieved in this way enables, for example, a homogeneous conformal coating of a freeform.



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In this free-form coating, a single ion source is now sufficient, in which the extraction grid is adjusted during the coating process depending on the geometry of the free form. The adjustment of the extraction grid parameters can optionally be implemented by rotation or translation of a holder for the extraction system in front of the one vessel for the ion source(s).

### AT A GLANCE ...

#### Application fields

Thin-film technology  
Sputter deposition  
Targeted surface ablation  
Production of free-form optics

#### Business

- Optical industry
- Semiconductor industry

#### USP

- better adjustment of beam profiles
- particularly compact design
- adjustable extraction grid system
- Possibility to coat objects of any geometry (free-form) with a freely adjustable coating thickness profile

#### Development Status

- Initial tests to optimise the method are currently being carried out and the design for a prototype plant is being created.

#### Patent status

European Patent EP3683820B1 ist granted.

## APPLICATION FIELD

The novel ion source is commercially interesting for coating companies and manufacturers of coating equipment, but also for companies (e.g. in the optics industry) that use such coating equipment in their manufacturing processes of free-form optics. In addition to the previously described applications in surface coating, the invention can also be used for targeted surface ablation (ion beam etching).

## ADVANTAGES OVER THE PRIOR ART

The advantage over previous approaches with multiple ion sources is that the device enables the coating of objects of arbitrary geometry with a specific layer thickness profile or the operation of grating ion engines in different operating modes with only one ion source with an adjustable extraction grating system, which both increases the lifetime of the engines and offers more flexible application possibilities.

## STATE OF THE PRODUCT DEVELOPMENT

Initial tests to optimise the method are currently being carried out and the design for a prototype plant is being created.

## COOPERATION OPPORTUNITIES

On behalf of Justus-Liebig-University Giessen TransMIT GmbH is looking for cooperation partners or licensees for distribution or further development in Germany, Europe, US, and Asia.

## A TECHNOLOGY OF



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