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## Surface plasmon lasers

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PROEFSCHRIFT

ter verkrijging van  
de graad van Doctor aan de Universiteit Leiden,  
op gezag van Rector Magnificus prof. mr. C. J. J. M. Stolker,  
volgens besluit van het College voor Promoties  
te verdedigen op donderdag 22 juni 2017  
klokke 10.00 uur

door

**Vasco Tomas Tenner**

## **PROMOTORES**

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Prof. dr. M. A. G. J. Orrit  
Dr. ir. S. J. van der Molen  
Prof. dr. J. M. van Ruitenbeek

## **COVER IMAGE**

By Vasco Tenner and Dirk Boonzajer Flaes. It shows the intensity and phase of the laser beam emitted by a surface-plasmon laser operating in the B-mode of a hexagonal metal hole array at distances from the sample ranging from  $1\ \mu\text{m}$  (left bottom) to  $300\ \mu\text{m}$  (right top). The images are based on the intensity and phase measurements shown in Fig. 6.4 and propagated numerically to the desired distance with a Fresnel propagator. The colors encode the local phase of the  $j = \pm 3$  component of the beam. Every image is scaled in order to create an esthetical ensemble.

The research reported in this thesis was conducted at the 'Leids Instituut voor Onderzoek in de Natuurkunde' (LION).

An electronic version of this dissertation is available at the Leiden University Repository (<https://openaccess.leidenuniv.nl>).

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*The mountains are calling and I must go.*

John Muir

Aan Rosalie



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