Understanding losses in halide perovskite thin films
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Semiconductors have become an inseparable part of our 21st century society. We find them in the heart of every microprocessor chip, transistor, light-emitting diode (LED), and photovoltaic (PV). Ground breaking experiments on silicon introduced by Shockley, Bardeen, and Brattain (1956 Nobel prize in Physics) provided the basic of our current understanding on semiconductors. Decades later, the studies of gallium nitride growth for LEDs by Akasaki, Amano, and Nakamura (2014 Nobel prize in Physics) have expanded our knowledge connecting electronics and light sciences. Halide perovskites have emerged recently as an elite class of semiconductors finding applications in PV, even though many fundamental questions still remain unanswered. This thesis is a first step to systematically contribute to answering such questions. We identify and disentangle inherent sources of losses which can explain the mysteriously long lifetime and record efficiency achieved in this semiconductor, and furthermore we demonstrate a novel architecture promising even better performing PVs.
UNDERSTANDING LOSSES IN HALIDE PEROVSKITE THIN FILMS
Front cover: wide-field photoluminescence experiment and unveiled CH$_3$NH$_3$PbBr$_3$ true grains with amorphous boundaries.

Back cover: Kikuchi patterns of CH$_3$NH$_3$PbI$_3$; a first successful step ever toward mapping the true grains (back cover).

Ph.D. thesis University of Amsterdam, Mei 2018
Understanding losses in halide perovskite thin films
Gede Widia Pratama Adhyaksa

A digital version of this thesis can be downloaded from http://www.amolf.nl.
UNDERSTANDING LOSSES IN HALIDE
PEROVSKITE THIN FILMS

ACADEMISCH PROEFSCHRIFT

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aan de Universiteit van Amsterdam
op gezag van de Rector Magnificus
prof. dr. K. I. J. Maex
ten overstaan van een door het college voor promoties
ingestelde commissie,
in het openbaar te verdedigen in de Agnietenkapel
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Gede Widia Pratama Adhyaksa

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