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Transfer of Triplet Excitons in Singlet Fission-Silicon Solar Cells

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BENJAMIN DAIBER

TRANSFER OF TRIPLET EXCITONS IN SINGLET FISSION-SILICON
SOLAR CELLS

Ph.D. Thesis, University of Groningen, December 2020

Benjamin Daiber

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university of
 groningen

Transfer of Triplet Excitons in Singlet Fission-Silicon Solar Cells

Experiment and Theory Towards Breaking the Detailed-Balance
Efficiency Limit

PhD thesis

to obtain the degree of PhD at the
University of Groningen
on the authority of the
Rector Magnificus Prof. C. Wijmenga
and in accordance with
the decision by the College of Deans.

This thesis will be defended in public on

9 April 2021 at 12.45 hours

by

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PROPOSITIONS

accompanying the dissertation

Transfer of Triplet Excitons in Singlet Fission-Silicon Solar Cells Experiment and Theory Towards Breaking the Detailed-Balance Efficiency Limit

by

Benjamin Daiber

1. Quenching of delayed PL can be used to detect transfer of triplet excitons into another semiconductor.
2. The wrong assumption about the noise distribution can systematically change your fitting results.
3. Singlet fission can improve the silicon solar cell with many different transfer mechanisms.
4. FRET can be efficient even into an indirect bandgap semiconductor like silicon, if the donor-acceptor distance is small.
5. Transfer of triplet excitons from an organic semiconductor into silicon can be enabled by controlling the polymorphism of tetracene.
6. Doing the right thing is becoming harder, the longer you wait, but you have to wait long enough to know what is right.
7. Once you think your problem has a trivial solution you have found a good solution.
8. Science would work better with an alphabetical author list.
9. The simplest way of explaining a graph or concept is the most understandable and will have the largest impact.
10. What the reviewers accept as sufficient is arbitrary in first approximation.

Dedicated to everyone who has treated me with kindness and love,
helped me on my journey, big and small.

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