

HORIZON
2020

Towards optical communication on silicon chips

Resultados

Información del proyecto

Opto silicon

Identificador del acuerdo de subvención:
964191

[Sitio web del proyecto](#) 

DOI

[10.3030/964191](https://doi.org/10.3030/964191) 

Proyecto cerrado

Fecha de la firma de la CE

16 Diciembre 2020

Fecha de inicio

1 Mayo 2021

Fecha de finalización

30 Abril 2025

Financiado con arreglo a

EXCELLENT SCIENCE - Future and Emerging Technologies (FET)

Coste total

€ 3 753 128,75

Aportación de la UE

€ 3 753 128,00

Coordinado por

TECHNISCHE UNIVERSITEIT
EINDHOVEN



Netherlands

CORDIS proporciona enlaces a los documentos públicos y las publicaciones de los proyectos de los programas marco HORIZONTE.

Los enlaces a los documentos y las publicaciones de los proyectos del Séptimo Programa Marco, así como los enlaces a algunos tipos de resultados específicos, como conjuntos de datos y «software», se obtienen dinámicamente de [OpenAIRE](#) .

Resultado final

[Measurement SOA gain spectrum](#)

Measurement of the gain spectrum of an optically pumped HexSiGe Semiconductor Optical Amplifier SOA

[Growth of a low dark current p-n junction](#)

Growth of a HexSiGe pn junction with shows low dark current in a currentvoltage characterization plot

[Passivation and contacts](#)

Improved surface passivation TUE contact formation IBM and electrical characterization see description WP1

[Growth of nominally undoped Hex-SiGe](#)

Growth of nominally undoped HexSiGe $n \approx 10^{17} \text{cm}^{-3}$ by growing the HexSiGe in a dedicated newly purchased MBE system

[Measurement absorption spectrum of Hex-SiGe](#)

TUE and TUM will measure the absorption spectrum and its polarization dependence for different light propagation directions of both strained and unstrained HexSiGe with photocurrent or integrating sphere spectroscopy using our supercontinuum laser source

[Optically pumped Hex-SiGe QW laser](#)

Optically pumped HexSi_{1-x}GexSi_{1-y}Gey_y quantum well laser using radial quantum wells see Fig 6

[Organization of an international symposium on Hex-SiGe](#)

We will organize an international symposium on hexSiGe in year 2 in order to increase the awareness on this new material for groups outside of our consortium

[Growth of an Au-free NW template on Si\(111\) or Ge\(111\)](#)

MBE growth of an Au-free nanowire template on Si(111) or Ge(111) We propose to grow purely wurtzite GaAs nanowires on a patterned Si(111) or Ge(111) substrate by using a gallium catalyst nanoparticle

[Carrier dynamics in strained QWs](#)

Report on carrier dynamics in HexSi_{1-x}GexSi_{1-y}Gey_y quantum wells See description WP4

[Growth of Hex-SiGe quantum wells](#)

Realization of HexSi_{1-x}GexSi_{1-y}Gey_y quantum wells see Fig 6b We will grow HexSi_{1-x}GexSi_{1-y}Gey_y QWs in close collaboration with WP1 and WP2 confirm the 2D nature of the electronic states and establish key structureproperty relationships

Websites, patent fillings, videos etc. (1)

[Public web page + logo !\[\]\(c507f772dba2b921f86777f01218e570_img.jpg\)](#)

Set up project web page Finalize the project logo

Open Research Data Pilot (1)

[Data management plan !\[\]\(a03a7eb2f4046e1d3c76772003e549ea_img.jpg\)](#)

The data management plan will describe where we will store the relevant data during the project as well as after publication

Publicaciones

Peer reviewed articles (15)

[Stimulated emission from hexagonal silicon-germanium nanowires !\[\]\(5361750c22c4e047a52f4eac1ec2d4cc_img.jpg\)](#)

Autores: Marvin A. J. van Tilburg, Riccardo Farina, Victor T. van Lange, Wouter H. J. Peeters, Steffen Meder, Marvin M. Jansen, Marcel A. Verheijen, M. Vettori, Jonathan J. Finley, Erik. P. A. M. Bakkers, Jos. E. M. Haverkort

Publicado en: Communications Physics, Edición 7, 2024, Página(s) 328, ISSN 2399-3650

Editor: Springer Nature publishing

DOI: 10.1038/s42005-024-01824-1

[Onset of uncontrolled polytypism during the Au-catalyzed growth of wurtzite GaAs nanowires !\[\]\(7d1d6890825e83a6a4a51febe2dcc7f3_img.jpg\)](#)

Autores: Wouter H. J. Peeters, Marco Vettori, Elham M. T. Fadaly, Alexandre Danescu, Chenyang Mao, Marcel A. Verheijen, Erik P. A. M. Bakkers

Publicado en: Physical Review Materials, Edición 8, 2024, Página(s) L020401-1, ISSN 2475-9953

Editor: American Physical Society

DOI: 10.1103/physrevmaterials.8.l020401

[Growth-Related Formation Mechanism of I3-Type Basal Stacking Fault in Epitaxially Grown Hexagonal Ge-2H](#)

Autores: Laetitia Vincent,* Elham M. T. Fadaly, Charles Renard, Wouter H. J. Peeters, Marco Vettori, Federico Panciera, Daniel Bouchier, Erik P. A. M. Bakkers, and Marcel A. Verheijen

Publicado en: Advanced Materials Interfaces, 2022, ISSN 2196-7350

Editor: Wiley VCH

DOI: 10.1002/admi.202102340

[Hexagonal silicon-germanium nanowire branches with tunable composition](#)

Autores: A Li, H I T Hauge, M A Verheijen, E P A M Bakkers, R T Tucker, L Vincent and C Renard

Publicado en: Nanotechnology, Edición 09574484, 2022, ISSN 0957-4484

Editor: Institute of Physics Publishing

DOI: 10.1088/1361-6528/ac9317

[Dimension Control of Hexagonal SiGe Single Branched Nanowires](#)

Autores: Denny Lamon, Hidde A. J. van der Donk, Marcel A. Verheijen, Marvin M. Jansen, Erik P. A. M. Bakkers

Publicado en: Nano Letters, Edición 25, 2025, Página(s) 5741-5746, ISSN 1530-6984

Editor: American Chemical Society

DOI: 10.1021/acs.nanolett.5c00267

[Continuous Wave Mid-Infrared Lasing from Single InAs Nanowires Grown on Silicon](#)

Autores: Steffen Meder, Benjamin Haubmann, Fabio del Giudice, Paul Schmiedeke, David Busse, Jona Zöllner, Jonathan J. Finley, Gregor Koblmüller

Publicado en: Advanced Functional Materials, Edición 2414046, 2024, Página(s) 1-9, ISSN 1616-301X

Editor: John Wiley & Sons Ltd.

DOI: 10.1002/adfm.202414046

[Giant Optical Oscillator Strengths in Perturbed Hexagonal Germanium](#)

Autores: Abderrezak Belabbes, Friedhelm Bechstedt, Silvana Botti

Publicado en: physica status solidi – Rapid Research Letters 16(4), Edición 31-12-2021, 2021, ISSN 1862-6254

Editor: Wiley - VCH Verlag GmbH & CO. KGaA

DOI: 10.1002/pssr.202100555

[Ensemble averages of ab initio optical, transport, and thermoelectric properties of hexagonal SixGe1-x alloys](#)

Autores: Pedro Borlido, Friedhelm Bechstedt, Silvana Botti, Claudia Rödl

Publicado en: Phys.Rev.Materials, Edición 7, 2023, Página(s) 014602, ISSN 2475-9953

Editor: American Physical Society

DOI: 10.1103/physrevmaterials.7.014602

[Low Surface Recombination in Hexagonal SiGe Alloy Nanowires: Implications for SiGe-Based Nanolasers](#)

Autores: Wilhelmus J. H. (Willem-Jan) Berghuis, Marvin A. J. van Tilburg, Wouter H. J. Peeters, Victor T. van Lange, Riccardo Farina, Elham M. T. Fadaly, Elsa C. M. Renirie, Roel J. Theeuwes, Marcel A. Verheijen, Bart Macco, Erik P. A. M. Bakkers, Jos E. M. Haverkort, Wilhelmus M. M. (Erwin) Kessels

Publicado en: ACS Appl. Nano Mater., Edición 7 issue 2, 2024, Página(s) 2343–2351, ISSN 2574-0970

Editor: American Chemical Society

DOI: 10.1021/acsanm.3c05770

[Nanosecond Carrier Lifetime of Hexagonal Ge](#)

Autores: Victor T. van Lange, Alain Dijkstra, Elham M. T. Fadaly, Wouter H. J. Peeters, Marvin A. J. van Tilburg, Erik P. A. M. Bakkers, Friedhelm Bechstedt, Jonathan J. Finley, Jos E. M. Haverkort

Publicado en: ACS Photonics, Edición 11, 2024, Página(s) 4258-4267, ISSN 2330-4022

Editor: American Chemical Society

DOI: 10.1021/acsp Photonics.4c01135

[Carrier cooling in direct bandgap hexagonal silicon-germanium nanowires](#)

Autores: M. F. Schouten, M. A. J. van Tilburg, V. T. van Lange, W. H. J. Peeters, R. Farina, M. M. Jansen, M. Vettori, E. P. A. M. Bakkers, J. E. M. Haverkort

Publicado en: Applied Physics Letters, Edición 125, 2024, Página(s) 112106, ISSN 0003-6951

Editor: American Institute of Physics

DOI: 10.1063/5.0211035

[2H-Si/Ge for Group-IV Photonics: on the Origin of Extended Defects in Core-Shell Nanowires](#)

Autores: Fabrizio Rovaris, Wouter H. J. Peeters, Anna Marzegalli, Frank Glas, Laetitia Vincent, Leo Miglio, Erik P.A.M. Bakkers, Marcel A. Verheijen and Emilio Scalise

Publicado en: ACS Appl. Nano Mater., Edición 7, 2024, Página(s) 9396–9402, ISSN 2574-0970

Editor: American Chemical Society

DOI: 10.1021/acsanm.4c00835

[Band lineup at hexagonal SixGe1-x/SiyGe1-y alloy interfaces](#)

Autores: Abderrezak Belabbes, Silvana Botti, Friedhelm Bechstedt

Publicado en: Physical Review B, Edición 24699950, 2022, Página(s) 085303, ISSN 2469-9950

Editor: American Physical Society (APS)

DOI: 10.1103/physrevb.106.085303

[Direct bandgap quantum wells in hexagonal Silicon Germanium](#) 

Autores: Erik Bakkers, Wouter Peeters, Victor Lange, Abderrezak Belabbes, Max van Hemert, Marvin Jansen, Riccardo Farina, Marvin Tilburg, Marcel Verheijen, Silvana Botti, Friedhelm Bechstedt, Jos Haverkort

Publicado en: Nature Communications, Edición 15, 2024, Página(s) 5252, ISSN 2041-1723

Editor: Nature Publishing Group

DOI: 10.21203/rs.3.rs-3875137/v1

[First-principles insight in structure-property relationships of hexagonal Si and Ge polytypes](#) 

Autores: Martin Keller; Abderrezak Belabbes; Jürgen Furthmüller; Friedhelm Bechstedt; Silvana Botti

Publicado en: Phys.Rev Materials, Edición 7, 2023, Página(s) 064601-1-15, ISSN 2475-9953

Editor: American Physical Society

DOI: 10.1103/physrevmaterials.7.064601

Conjuntos de datos

Conjuntos de datos vía OpenAIRE (6)



[Direct bandgap quantum wells in hexagonal Silicon Germanium](#) 

Autores: Bakkers, Erik P.A.M.

Publicado en: Zenodo

[Growth - related formation mechanism of I3 - type basal stacking fault in epitaxially grown hexagonal Ge - 2H](#) 

Autores: Vincent, Laetitia; Fadaly, Elham M.T.; Renard, Charles; Peeters, Wouter H.J.; Vettori, Marco; Panciera, Federico; Bouchier, Daniel; Bakkers, Erik P.A.M.; Verheijen, Marcel A.

Publicado en: Zenodo

[Onset of uncontrolled polytypism during the Au-catalyzed growth of wurtzite GaAs nanowires](#) 

Autores: Bakkers, Erik; Peeters, Wouter

Publicado en: Zenodo

[Hexagonal Silicon-Germanium Nanowire Branches with Tunable Composition](#) 

Autores: Bakkers, Erik

Publicado en: Zenodo

[Growth Rate of Hexagonal SiGe Multi Quantum Wells](#)

Autores: Bakkers, Erik; Peeters, Wouter

Publicado en: Zenodo

[Nanosecond carrier lifetime of hexagonal Ge](#)

Autores: van Lange, Victor Theodoor; Dijkstra, Alain; Fadaly, Elham; Peeters, Wouter; van Tilburg, Marvin; Bakkers, Erik; Bechstedt, Friedhelm; Finley, Jonathan; Haverkort, Jos

Publicado en: Zenodo

Otros productos de investigación

Otros productos de investigación a través de OpenAire (1)



[Ensemble averages of ab initio optical, transport, and thermoelectric properties of hexagonal Si_xGe_{1-x} alloys](#)

Autores: Borlido, Pedro; Bechstedt, Friedhelm; Botti, Silvana; Rödl, Claudia

Publicado en: arXiv

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Permalink: <https://cordis.europa.eu/project/id/964191/results/es>

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