



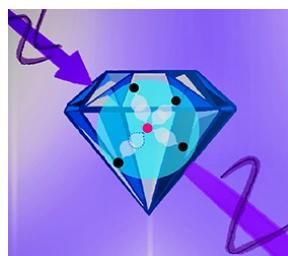
# GEMaC

Groupe d'Étude  
de la Matière Condensée

## NEWS

### Last news from GEMaC

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#### Blue diamonds to understand spin-orbit interaction

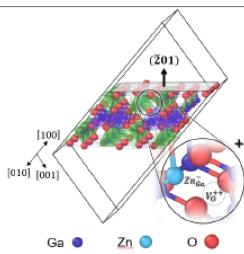
April 11, 2024

Very high resolution optical absorption measurements have made it possible to understand the light spectrum of boron-doped synthetic diamond, as part of an international collaboration between GEMaC and Kyoto University (Japan).

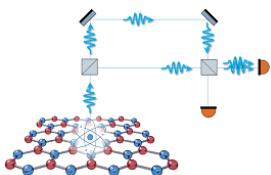
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#### Native “imperfections” enables room-temperature p-type conductivity in -Ga<sub>2</sub>O<sub>3</sub>

November 23, 2023



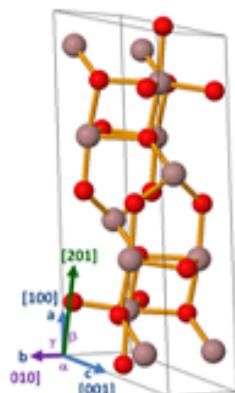
Researchers from GEMaC have demonstrated an important step for the realization of power electronics devices.



### Coherent photons in two dimensions

August 25, 2023

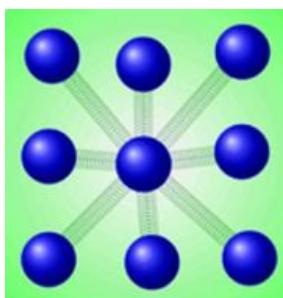
Researchers at GEMaC have published two complementary studies demonstrating that single photons emitted by a two-dimensional material are coherent, a property that is essential for applications in quantum computing. This work was the subject of an INP highlight.



### Gallium oxide pushes the limits of silicon for power electronics

May 25, 2022

Editor's Choice and one of the most downloaded papers of the 'Materials' (MDPI) journal in the first five months of the year, this review discusses the application of ultra-wide bandgap semiconductors in power electronic devices, focusing in particular on gallium oxide.



### A new theoretical approach reveals the emergence of complex self-organised structures in spin crossover materials

January 31, 2022

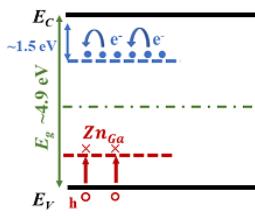
Researchers from GEMaC laboratory have developed an effective electro-elastic model to simulate phase transitions in spin crossover crystals. The resolution of this model is 50 times faster than the traditionally used model, which has allowed them to reveal a wide variety of complex phenomena.



### A series of discoveries about the incredible conductive and transparent materials known as vanadates.

November 14, 2021

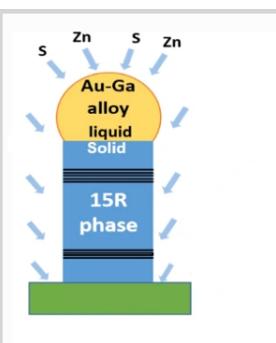
Strontium and calcium vanadates ( $\text{SrVO}_3$  and  $\text{CaVO}_3$ ) are perovskite oxides. They are materials with multiple potential functions and applications. Here is an overview of recent advances, to which GEMaC has made a major contribution.



## A material conducts to a bright future

September 17, 2021

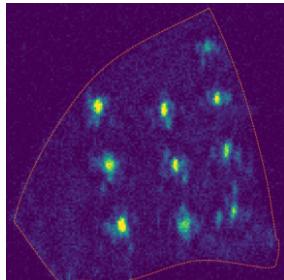
GEMaC researchers show how the conductivity of the spinel material  $\text{ZnGa}_2\text{O}_4$  can be controlled over a very wide range, opening up applications in ultra-high power electronics and deep ultraviolet optoelectronics.



## A new crystal phase in semiconductor nanowires

June 25, 2021

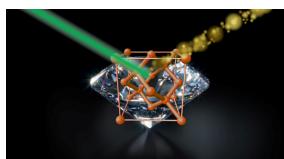
GEMaC researchers, in partnership with the LEM (CNRS-Onera), have produced and characterised an original and unexpected crystal structure in nanoscale zinc sulphide ( $\text{ZnS}$ ) wires.



## Controlled positioning of quantum light sources in a 2D material

June 18, 2021

By exciting a two-dimensional material with an electron microscope beam, our researchers and their collaborators have uncovered new sources of single photons in crystalline materials.



## An Equipex project on diamond for quantum applications

May 31, 2021

At UVSQ, the GEMaC laboratory is contributing its expertise on the growth and characterisation of diamonds by cathodoluminescence to the e-Diamant project.



## From the GEMaC laboratory to space: a 20-year history of innovative thrusters for miniature satellites

February 3, 2021

A look back at the incredible story of the Petit Propulseur Innovant (PPI) and its successor the  $\mu$ -PPI, whose prototypes were invented, designed and built at GEMaC.



## GEMaC welcomes two new colleagues!

December 1, 2020

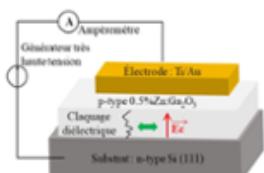
We would like to welcome two new GEMaC members hired by UVSQ, Jean-Michel Chauveau (Professor) and Sébastien Colinot (Assistant Engineer).



## MOSTRA project involving GEMaC receives funding from Île-de-France region

November 27, 2020

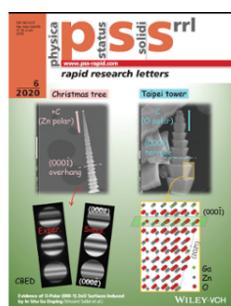
This project is focused on the new generation transmission electron microscope and involves several laboratories in Île-de-France region, including GEMaC. It will be funded via SESAME 2020 program.



## Critical electric field record for gallium oxide

November 2, 2020

Increasing the voltage and avoiding breakdown of materials used in power electronics remain a current challenge. The researchers broke a record for the critical electric field with a value of 13.2 MV/cm. This result has been selected as "News from Physics Institute" of CNRS.



## Crystal facet engineering: Christmas tree or Taipei tower-like nanostructures

July 3, 2020

The work of GEMaC researchers and engineers is on the cover of Physica Status Solidi RRL of June.



## GEMaC embarks with Flagship Graphene to Core 3

May 28, 2020

Flagship Graphene announced a transition to Core 3, the fourth funding round of the €1 billion research initiative funded by the European Commission.

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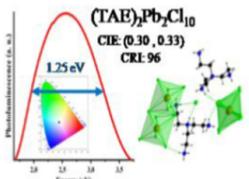


## Covid19: GEMaC maintains its activities during UVSQ shutdown

May 5, 2020

During the health crisis linked to the Covid19 pandemic, UVSQ along with other French universities had to close its doors on March 16, 2020. Nevertheless, the activities of the GEMaC continued unabated.

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## A stable white light source for modern lighting and displays

March 19, 2020

French and Tunisian researchers evidence and explain very broadband white light emission that is comparable to the reference white light.

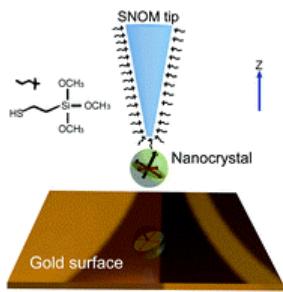
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## New website for GEMaC

March 2, 2020

New, up-to-date and adjustable design suitable for all screen types (computer, tablet, mobile phone) as well as a updated structure based on targeted and accessible content.

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## A single nanocrystal maps confined light at the nanometer scale

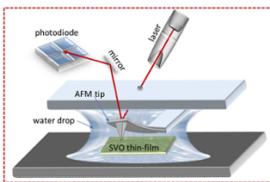
February 28, 2020

The plasmonic properties of a nanohole array probed by a single nanocrystal grafted at the tip of an optical near-field probe: this work by GEMaC researchers was published in the journal Nanophotonics in February 2020.

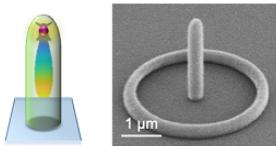
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## A promising way of the integration of single crystalline oxides in electronic devices

January 23, 2020



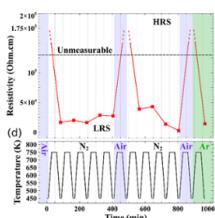
GEMaC and ILV researchers and engineers demonstrate a simple and promising way to transfer epitaxial oxide layers onto silicon



## A polymer antenna for the realisation of a bright and directional single photon source

November 4, 2019

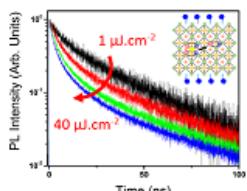
Researchers from GEMaC and LPQM (ENS Paris-Saclay) have developed a photonic cavity incorporating a light nanoemitter for efficient quantum light emission.



## Additional functionality in a material with a thousand applications

September 11, 2019

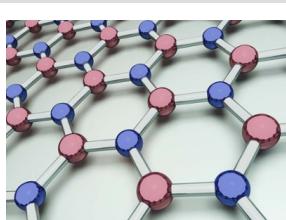
Bismuth iron garnet, a material with already remarkable properties, becomes conductive with adjustable resistivity.



## A better understanding of optical properties of hybrid perovskites for photovoltaics and light emission

August 15, 2019

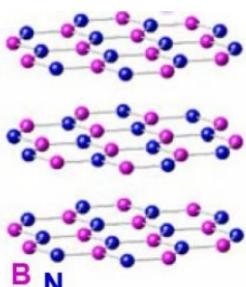
Researchers from GEMaC and LuMIn labs unveil charge recombination dynamics in 2D hybrid perovskites, a promising new class of semiconductor materials.



## GEMaC joins the European Graphene Flagship

May 1, 2019

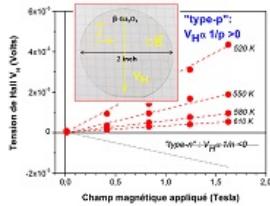
The University of Versailles St-Quentin-en-Yvelines joined the European Graphene Flagship research consortium.



## Hexagonal boron nitride, a crystal with astonishing ultraviolet light

April 25, 2019

Hexagonal boron nitride (hBN) emits ultraviolet light with an unusually high intensity for an indirect semiconductor. This apparent contradiction was finally explained by the particular nature of the excitons, revealed both by quantitative measurements and by their modelling.



## A promising material for power electronics and optoelectronics in the ultraviolet range

April 25, 2018

For the first time, researchers have succeeded in manufacturing large-diameter substrates of both "n" and "p" type -Ga<sub>2</sub>O<sub>3</sub> semiconductors, making it possible to envision the development of components for both power electronics and optoelectronics in the far ultraviolet.

» All the news

## NEWS IN BRIEF

**08/03/2024**

A video portrait of Marie-Amandine Pinault-Thaury, researcher at GEMaC lab !

**31/01/2024**

Welcome to **Vincent Polewczky**, new CNRS researcher in GEMaC (axis 2)!

**17/01/2024**

Welcome to **Park Serim**, visitor student from Séoul (axis 1).

**17/11/2023**

Welcome to the new members:

**Helmi FARTAS** - PhD student  
**Hien PHAN** - PhD student  
**Estelle LOIRE** - CNRS engineer

### **1/09/2023**

Welcome to the new members:

**Valérie Le Berre** (Administration)  
**Hanadi Mehdi** (ATER)

as well as to visitors:

Fabiola Bravo Hualpa  
Erick Serquen Infante  
Mouhamadou Sy

### **1/04/2023**

Welcome to our new master students:

Barbara Belza (axe 1)  
Assane Gueyer (axe 2)  
Helmi Fartas (axe 3)  
Thi Hien Phan (axe 3)

### **1/01/2023**

Welcome to Moussa MEBARKI (PhD student)

### **10/10/2022**

GEMaC in the news:

- a portrait of Jean-Pierre Hermier, professor of quantum nanophotonics and vice director of GEMaC,
- a column on quantum computer by Aymeric Delteil on the occasion of the Nobel Prize of Alain Aspect

### **3/10/2022**

Welcome to **Domitille Gérard**, PhD student (team OEN)

### **30/05/2022**

Welcome to **Lilay Gros Desormeaux**, master student (team OEN)

### **9/05/2022**

Welcome to **Océane Capelle**, master student (team OEN)

## **11/04/2022**

Welcome to the new members:

**Élysé LAURENT**, master student (team DIAM)

**Mohamed Amine M'TIR**, master student (team P2MC)

## **25/03/2022**

Welcome to **Théotime Bergèse**, master student (team OEN)

## **10/03/2022**

Welcome to the new members:

**Soroush Alain ABBASI ZARGALEH**, post-doc (FOX)

**Ndiaga CISSE**, master student (M2, P2MC)

**Hamid NEGGAZ**, master student (M2, FOX)

## **21/02/2022**

Welcome to **Julien GARCIA** and **Nouhaila AKHYAR**, master students (NSP)

## **01/02/2022**

Welcome to **Alban Degezelle**, master student (team NSP)

## **12/10/2021**

Congratulations Sumit Kumar for your Graduate student award at EMRS fall meeting 2021!

## **5/10/2021**

Congratulations Étienne Carré for your PhD award ONERA 2021 "Matériaux and Structures"!

## **1/10/2021**

Welcome to the new members:

**Ibtissem Benguettat**, ATER (teamFOX) ;

**Thi Trang Nguyen**, PhD student (team OEN) ;

**Joanna Urban**, postdoc (ENS Paris-Saclay)

**Hugo Levy-Falk**, postdoc (ENS Paris-Saclay)

## **15/07/2021**

Three projects of which GEMaC is coordinator or partner, have been accepted for

funding by ANR:

**E-SCAPE** (PI: Aymeric Delteil)

**GOPOWER** (PI: Ekaterine Chikoidze)

**SUPERNICKEL** (local PI: Joseph Scola)

**1/07/2021**

Welcome to **Subodh Gautam**, post-doctoral researcher (team DIAM)

**26/05/2021**

Welcome to **Séléna Rippe**, engineering student (team OEN)

**26/05/2021**

Welcome to **Domitille Gérard**, master student (M1, team OEN)

**7/04/2021**

Welcome to the new members:

**Hadji Adama Seck**, master student (M1, team P2MC);

**Basma Zouari**, master student (M2, team P2MC);

**Rémi Legrand**, DUT intern (team Fox);

**2/03/2021**

Welcome to the new members:

**Thi Huyen Guyen**, master student in GEMaC (team OEN) and LuMIn;

**Krishnaraja Acharya**, master student (team FOX);

**Idris Aboubakari**, master student (team NSP);

**Nour Eddine Riahi**, master student (team NSP).

**3/02/2021**

The project *eDiamant*, involving GEMaC, is recipient of the call for project EquipEx+!

**4/01/2021**

Welcome to **Nour Belmouri**, PhD student in team P2MC !

**1/12/2020**

Welcome to **Mohamed Bouras**, new post-doc in team DIAM !

**1/10/2020**

Welcome to four new recruits: **Yoan Bourlier** (post-doc in team FOX), **Clarissee Fournier**

(PhD student, team OEN), **Zeyu Chi** (PhD student, team FOX) et **Gia Long Ngo** (PhD student, team OEN).

## Seminars

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### **Nano optics with fast electrons**



Séminaire

May 23, 2024

Mathieu Kociak

Laboratoire de physique des solides (LPS), CNRS , Université  
Paris Saclay

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### **MBE Growth of severely lattice mismatched Te compounds and their crystallographic characterizations**



Séminaire

April 26, 2024

Masakazu Kobayashi

Department of Electrical Engineering and Bioscience of Waseda  
University, Tokyo, Japan

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### **Excitons dans le nitrure de bore hexagonal et ses homostructures en rotation : propriétés de volume, aux surfaces et aux interfaces**



Séminaire

March 25, 2024

Sébastien Roux

LPCNO, Toulouse

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### **Piezoelectricity in ZnO nanowires: doping and polarization**



Séminaire

March 21, 2024

Vincent Consonni

Laboratoire des Matériaux et du Génie Physique de Grenoble

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» To the seminars

## Last open positions

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Proposition  
thèse

### Cathodoluminescence of colour centres in diamond for quantum technologies

October 1, 2024 - September 30, 2027

  
Proposition  
thèse

### Matériaux pour la récupération d'énergie : Analyse physico-chimique de nano-composites polymères-semiconducteurs

October 1, 2024 - September 30, 2027

  
Proposition  
thèse

### Towards deterministic creation of quantum emitters in 2D materials for optical quantum technologies

October 1, 2024 - September 30, 2027

» To all the open positions

## PhD defences

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Soutenance  
de thèse

### Epitaxial growth of thin Fe<sub>3</sub>O<sub>4</sub> films on ZnO by PLD: a perspective for Spintronics

December 20, 2023

Présentée par Ismail Madaci

thèse dirigée par Yves Dumont, Olena Popova, et Philippe Vennégùès

### Centres colorés contrôlés en position dans le nitre de bore hexagonal pour l'émission de photons uniques cohérents

December 19, 2023

Présentée par Clarisse Fournier  
thèse dirigée par Jean-Pierre Hermier et Aymeric Delteil

**Modélisation et visualisation de la dynamique  
spatiotemporelle des matériaux moléculaires à transition de  
spin**  
December 5, 2023

Présentée par Mamadou Ndiaye  
thèse dirigée par Monsieur Kamel Boukhebdaden et Monsieur  
Bassirou Lo

## Habilitations

**Réactivité de surfaces pour la fonctionnalisation**  
December 3, 2021

Présentée par **Damien AUREAU**  
Discipline : chimie - science des matériaux  
Laboratoire : ILV

**Étude de l'élasticité dans les matériaux à transition de spin  
par le modèle électro-élastique**  
November 30, 2021

Présentée par **Ahmed SLIMANI**  
Discipline : physique  
Laboratoire : GEMaC

**Propriétés optiques des pérovskites hybrides**  
November 12, 2020

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» Defence agenda