

# EUROMAT 2021

EUROPEAN CONGRESS AND EXHIBITION  
ON ADVANCED MATERIALS AND PROCESSES

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12. - 16. SEPTEMBER 2021

GRAZ, AUSTRIA

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THE AUSTRIAN SOCIETY FOR  
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## Area A

### Symposium A1

<b>2D Materials: Fundamentals, synthesis and applications</b>		
<b>Organizer</b>	<b>Institution</b>	<b>Contact email</b>
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<b>Abstract</b>		
<p>Hosting a range of exotic properties, 2D materials have generated a vast research output in the fields of condensed matter physics, chemistry, materials science, biology and engineering. By precisely controlling the composition, crystal structure, number and stacking order of individual layers, these materials provide an extensive material platform for scientific investigation and development of nano- and atomic-scale devices. The advances in synthesis, nanofabrication and characterization have enabled access to new physical phenomena, including the realization of exotic correlated insulating, ferromagnetic or superconducting states in twisted bi-layer graphene, purely two-dimensional (anti-)ferromagnetic materials and the identification of novel Weyl semimetal candidates in layered TMDCs.</p> <p>With high surface-to-volume ratios, mechanical flexibility and CMOS-compatible integration, these materials represent a unique platform for the miniaturization of next-generation nanodevices in a wide range of applications including flexible electronics, sensing, catalysis, clinical technologies and quantum computing. The potential and far-reaching impact of 2D materials crucially hinges on the fundamental understanding and atomic-scale control of their electrical, physical and chemical properties – representing the atomically-thin physical limit, the effects of defects, strain, phase transitions and interfacial interactions become increasingly important.</p> <p>This interdisciplinary symposium combines advances from fundamental research, synthesis and characterization of graphene, 2D materials and van der Waal heterostructures, as well as the latest developments towards industrial applications.</p> <p>The symposium will cover a wide range of topics including:</p>		
<b>Fundamentals</b>		
<ul style="list-style-type: none"><li>• Electronics</li><li>• Optoelectronics</li><li>• Quantum transport, magnetism and spintronics</li><li>• Photonics and plasmonics</li><li>• Caloritronics</li><li>• Twistronics and straintronics</li></ul>		

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- Mechanics
- Phase transitions
- 2D topological materials
- Nanoribbons and quantum dots
- Theory and simulation

## Synthesis and characterization

- Growth and synthesis techniques
- Integration and transfer methods
- Microscopy
- Spectroscopy
- Heterostructures
- Functionalization

## Applications

- Sensors, detectors and actuators
- Membranes, micro and nanofluidics
- Energy generation, conversion and storage
- Biomedical and health technologies
- Wearable and flexible devices
- Composites
- Paints, foams and coatings