

Proposal Evaluation Form



EUROPEAN COMMISSION

Horizon Europe (HORIZON)

**Evaluation Summary
Report (Review task) -
PATHFINDER - OPEN**

Call: HORIZON-EIC-2025-PATHFINDEROPEN
Type of action: HORIZON-EIC
Proposal number: 101258367
Proposal acronym: SLIDETRONIC
Duration (months): 36
Proposal title: 3D ferroelectric memory cube for self-powered edge intelligence
Activity: HORIZON-EIC-2025-PATHFINDEROPEN

N.	Proposer name	Country	Total eligible costs	%	Grant Requested	%
1	INSTITUTUL NATIONAL DE CERCETARE DEZVOLTARE PENTRU FIZICA MATERIALELOR	RO	480,875	16.03%	480,875	16.03%
2	UNIVERSITAT DE BARCELONA	ES	360,312.5	12.01%	360,312.5	12.01%
3	CHALMERS TEKNISKA HOGSKOLA AB	SE	529,936.25	17.67%	529,936	17.67%
4	TAMPEREEN KORKEAKOULUSAATIO SR	FI	503,560	16.79%	503,560	16.79%
5	FUNDACIO INSTITUT CATALA DE NANOCIENCIA I NANOTECNOLOGIA	ES	309,816.25	10.33%	309,816.25	10.33%
6	AIXTRON SE	DE	405,625	13.52%	405,625	13.52%
7	FOTONATION LIMITED	IE	409,625	13.66%	409,625	13.66%
Total:			2,999,750		2,999,749.75	

Abstract:

SLIDETRONIC will demonstrate a new memory-compute paradigm that couples two emerging ferroelectric effects—gate-field-stabilised ultrathin HZO and “sliding” polarisation in twisted van-der-Waals bilayers—inside a hybrid double-gate MoS₂ transistor. The device targets a linear ≥ 6-bit conductance window, < 10 fJ switching energy and > 10¹¹-cycle endurance, enabling convolutional-neural-network inference at < 20 fJ MAC⁻¹. Such efficiency would support battery-free smart-vision nodes, cut cloud traffic and help the EU Chips Act reach its ten-fold edge-AI energy goal.

Seven work packages form a closed design-build-test loop. WP0 trains AI force fields on ab-initio data, derives a defect-aware Hamiltonian for sliding ferroelectrics and releases a SPICE/Verilog-A model with a Bayesian co-optimiser. WP1 deposits wafer-scale hBN/MoS₂ and crystallises sub-3 nm HZO at ≤ 400 °C with leakage < 10⁻⁸ A cm⁻². WP2 assembles twist-controlled heterostructures and engineers edge contacts giving Rc < 1 kΩ μm. WP3 fabricates the slide-tronic FeFET and passes calibrated data to WP4, which validates 10-year retention across -40...125 °C and extracts variability libraries. WP5 merges models and statistics into an open PDK and simulates a 32 × 32 array. WP6 embeds this array in a hardware-in-the-loop CNN, demonstrating > 90 % accuracy on MLPerf-Tiny “Visual Wake-Word” with < 20 fJ MAC⁻¹. WP7 steers IP (three patent families), FAIR data, risk and exploitation, preparing a spin-off to anchor pilot-line scale-up.

Key risks—predictive modelling of sliding ferroelectricity, leakage-free 3 nm HZO and circuit-level fidelity—are controlled by eight milestones and continuous digital-twin feedback. By month 36 the consortium will deliver a laboratory proof-of-principle ferroelectric cube plus an openly shared tool-chain that de-risks TRL-4/5 transition. The result positions Europe for sovereign, sustainable, ultra-low-power AI hardware aligned with the Green Deal and upcoming neuromorphic standards.

Evaluation Summary Report

Evaluation Result

Total score: 4.65 (Threshold: 0)

Panel comments on proposal

The Evaluation Summary Report comprises the final score, a comment that summarises the assessment by the evaluation committee as well as any additional comments, possibly including advice not to resubmit the proposal. The evaluation committee drew its conclusions on the basis of the individual evaluation score and the outcome of its consensus discussions.

While not necessarily subscribing to each and every opinion expressed in the individual evaluation reports, the evaluation committee finds that the comments from the evaluators provide a fair overall assessment, indicating both essential strengths, shortcomings and weaknesses identified in the proposal.'

According to the predefined scoring scale the proposal is excellent.

The panel finds that the long-term vision is consistently considered as ambitious and highly relevant, with the integration of sliding ferroelectricity, ultrathin HZO, and hybrid FeFET architectures positioned to enable radically new compute-in-memory hardware for edge AI and self-powered sensors, aligning with EU priorities. The panel agrees that the potential for transformative impact is strong. However, the panel also agrees with the opinion of some evaluators that the energy efficiency claims are insufficiently substantiated as well as that the path from device concept to large-scale systems is not fully developed. The science-towards-technology breakthrough is seen as novel, concrete, and ambitious providing a predictive, defect-aware model of sliding ferroelectricity, hybrid double-gate FeFETs, but high-risk integration challenges (e.g. stability at <3 nm, twist-angle control, variability, large-scale array fabrication) are only partly addressed. The objectives and methodology are regarded as concrete, measurable, and aligned with a proof-of-principle at TRL 3, with strong modelling-to-fabrication workflow and robust open science practices; however, fallback options in case of fabrication issues are not sufficiently detailed. The interdisciplinary approach is a clear strength, effectively linking physics, 2D materials, device engineering, AI/ML modelling, and system benchmarking. Overall, the project is judged high-risk /high-gain with outstanding transformative potential, with some concerns in experimental feasibility, integration strategy, and validation of bold performance claims.

Criterion 1 - Excellence

Score: **4.75** (Threshold: 4 / 5.00 , Weight: 60.00%)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the work programme:

Long-term vision: How convincing is the vision of a radically new technology and relevant potential solutions, towards which the project would contribute in the long term?

The proposal presents a compelling vision of a radically new technology for compute-in-memory edge AI. It addresses pressing limitations of current NPUs with an innovative hybrid FeFET architecture that leverages sliding ferroelectricity and BEOL-compatible materials like hBN. The concept is articulated with clear TRL progression, strong interdisciplinarity, and potential for transformative impact in self-powered AI sensors aligned with EU strategic goals. However, while the vision is ambitious, some claims (e.g., >100x energy efficiency leap) rest heavily on simulation and theoretical models, with key physical demonstrations still at low TRL. The 100x efficiency is not well supported.

The proposal presents an ambitious long-term vision to radically transform computing through a new in-memory-computing (IMC) paradigm exploiting sliding ferroelectricity and hybrid FeFET architectures. This vision aligns strongly with EU strategic priorities such as the Green Deal, digital sovereignty, and energy sustainability. The ambition to develop battery-free, ambient-powered AI sensors has significant societal and environmental implications, representing a transformative technological breakthrough. However, certain elements of this vision, such as using sliding ferroelectricity in 2D materials for memory and compute-in-memory applications, have also been examined and uniqueness of the suggested approach is not explained clearly. While the proposal states a clear end-goal, the pathway from innovative device concepts to fully integrated systems is not discussed in detail.

The project poses a very clearly and convincingly articulated long term vision for a new technology that will address most pressing needs to overcome non-trivial barriers towards camera SoC and related fields.the project wants to pave the way towards a multifunctional device based on an array of memory FeFETs exploiting sliding ferroelectricity in van-der-Waals heterostructures combined with ultrathin Hf0.5Zr0.5Ox (HZO) ferroelectrics, which could drastically improve figures of merit in this field.

This proposal provides a convincing vision of a radically new technology, by addressing a multitude of current issues faced by AI-driven devices in terms of energy demand and reliability. An attractive solution in terms of device design is advanced alongside self-powering by energy harvesting. These two points together will contribute to the long term deployment of an alternatively new technology that will contribute to European technological autonomy.

Science-towards-technology breakthrough: How concrete, novel and ambitious is the proposed science-towards-technology breakthrough with respect to the state-of-the-art? What advancement does it provide towards realising the envisioned technology?

The proposed translational breakthroughs are indeed highly novel and ambitious. The integration of sliding ferroelectricity with ultrathin HZO in a hybrid double-gate FeFET is unprecedented. The plan to build a predictive, defect-aware model of sliding ferroelectricity and a calibrated Verilog model adds strong scientific depth and engineering relevance. In my opinion, this moves beyond the current state-of-the-art, which lacks predictive control.

While the breakthroughs are well-defined, their realisation hinges on overcoming several high-risk barriers, including material stability at <3 nm, precise twist-angle control, and analog linearity under variability, which is a major issue for practical computing systems. The novelty of combining very disparate material systems (e.g. hBN and HZO) introduces significant integration complexity that is only partly addressed in the proposal.

The proposed scientific breakthroughs are concrete, ambitious, and clearly defined. The concept of a hybrid double-gate FeFET architecture that integrates sliding ferroelectricity in hBN with conventional $Hf_{0.5}Zr_{0.5}O_2$ (HZO) layers is highly innovative and addresses key challenges in current IMC technologies, such as high energy consumption and limited scalability. This represents a significant advancement over the state-of-the-art. However, while achieving individual components appears feasible, the integration into a hybrid device and realization of large-scale arrays remain insufficiently explained. Additionally, the proposal does not fully clarify how its approach is distinct from other emerging efforts in sliding ferroelectric devices.

Three main, concrete breakthroughs will be delivered by the consortium: modeling of sliding ferroelectricity, the achievement of a hybrid, double gate novel mem-transistor based on HZO, and a full compac model for a 32 x 32 slidetronic array, which will constitute the final technology. These are very concrete and ambitious, well explained and articulated and well beyond the state-of-the-art. The approach proposed is original and feasible, the proposed technology could very well be delivered, along with other side results.

The science towards technology is novel and ambitious, however still presented in a very concrete way in relation to the current state of art. The proposed project is benchmarked in terms of performance, untested approaches and how science will be employed to realise the envisaged technology. The actual prototyping phase is completely guided by fundamental science, which is supported by comprehensive simulations and avoiding an empirical trial and error approach.

Objectives: How concrete and plausible are the proposed objectives? To what extent are high-risk/high-gain research approach for achieving them? How sound is the proposed methodology, including the underlying concepts, models, assumptions, appropriate consideration of the gender dimension in research content, and the quality of open science practices?

The objectives are clearly defined and well-aligned demonstrating a concrete and plausible path to proof-of-principle at TRL 3. The high-risk/high-gain approach is evident in the integration of sliding ferroelectricity, ultrathin HZO, and 3D stacking. Open science practices are robust and integrated in the proposal research. Experimental alternatives in case of fabrication setbacks are not sufficiently detailed. The proposal addresses interdisciplinarity and researcher training. There is no gender dimension relevant to this specific research context.

The objectives set out in the proposal are specific, measurable, and well-aligned with achieving significant technological advances. The methodology is described in detail, covering modeling, experimental fabrication, characterization, and system-level simulations, and appears scientifically sound. It is built on solid underlying concepts and models, with clear assumptions stated. The proposal also incorporates strong open science practices, including commitments to data and model sharing, which strengthens its overall approach. However some possible technical challenges (in fabrication process or manufacturing), such as integration of a hybrid double-gate FeFET with both HZO and sliding ferroelectric hBN remains or large-scale fabrication of sliding ferroelectric layers and their reliable integration into crossbar arrays are not elaborated clearly.

The objectives are sound, realistic and clear, while exhibiting a high risk / high gain character, since a technology such as the final 32 x 32 device array does not exist in the market. The methodology proposed is adequate to pursue the consortium work plan, combining modeling, growth, characterization and validation in the lab environment. Open science practices are correctly addressed. The research proposed here is not subject to a gender dimension.

The proposed objectives are concrete and plausible and have been mapped against specific and measurable KPIs. Together they provide the pathway to achieve the envisaged proof of concept, starting with predictive modelling of a recently discovered phenomenon, moving on into the fabrication of thin films and their subsequent integration in a new prototype device, and testing its reliability. In addition, AI will be employed as a co-designing tool of the devices. Despite the high risk of the overall goal, the approach used to design individual objectives appears sensible to transform a high risk project into a high gain one. The proposed methodology is described in sufficient detail to re-assure that the underlying principles and assumptions are correctly evoked to drive the project towards the main objective. There is no gender considerations in this project. The quality of open science fully meets the expectations.

Interdisciplinarity: How relevant is the interdisciplinary approach from traditionally distant disciplines for achieving the proposed breakthrough?

The interdisciplinary approach is highly relevant and well-structured, integrating traditionally distant fields—quantum physics, AI/ML modelling, 2D materials synthesis, ferroelectric device engineering, and edge-AI systems. The consortium spans the full chain from atomistic modelling to system-level benchmarking. The knowledge contributions are clearly defined, and data-sharing enhance integration and project coherence. Some interfaces, such as between material modelling and device fabrication, rely on high-fidelity predictions that may be hard to validate experimentally and not sufficiently discussed.

The interdisciplinary approach in the proposal is highly relevant and essential for achieving the proposed technological breakthrough. It effectively combines expertise from materials science, device physics, fabrication engineering, electronics, and AI system architecture. Collaboration among partners is well-structured and designed to ensure cross-disciplinary environment. This diversity of expertise is appropriate, enabling the project to address complex challenges from fundamental materials problems to system-level implementation. However, the proposal does not provide detailed information on how the coordination of this diverse set of disciplines will ensure seamless integration of results across the various research stages.

The proposal is highly interdisciplinary, combining a very broad range of experimental techniques in materials science with theory and an emerging field such as artificial intelligence. This approach is of fundamental importance to succeed, since all of the above techniques and fields are necessary to predict, design, grow and validate the final technology proposed. Even within materials science itself, 2D materials with ferroelectric ionic oxides come from different sub-fields that are just being merged as we speak. Their combination will allow exploring the interplay of distant physical phenomena that will produce the new functionality sought by the consortium.

The interdisciplinary is well presented and corroborated by showing an successive alignment of research communities, which thereby brings closer together some communities that often are at extreme positions of the research spectrum. From the outset, the project will be driven by the experts on materials theory and simulation in close collaboration with partners with expertise in nanofabrication and characterisation. Half-way through the project the industrial partner will carry out the system benchmarking. This cradle-to-grave approach is interdisciplinary.

Criterion 2 - Impact

Score: 4.50 (Threshold: 3.5 / 5.00 , Weight: 20.00%)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the work programme:

Long-term impact: How significant are the potential transformative positive effects that the envisioned new technology would have to our economy, environment and society?

The proposed technology promises transformative impact across multiple domains. It targets significant energy reduction and battery-free operation for edge AI. Economically, it can open up emerging markets in self-powered sensors and neuromorphic ICs, with a clear IP and spin-off strategy to support European tech sovereignty. Societally, it emphasizes privacy in AI. Quantified environmental benefits are simulation-based and challenges for experimental validation and not adequately discussed. Some claims—such as benefits to ageing populations—are stated but not deeply developed or backed by social science references or inputs.

The proposal clearly outlines significant transformative potential for positive economic, environmental, and societal impacts. The envisioned ultra-low-power, self-powered AI memory cubes integrated into electronic devices can substantially reduce energy consumption in pervasive computing and Internet of Things (IoT) applications, directly supporting EU sustainability and climate goals. The project offers potential for considerable societal benefits, enabling technological advancements in healthcare and environmental monitoring. Moreover, successful realization can promote Europe's leadership in cutting-edge electronics technologies. However, despite these promising impacts, technical risks and uncertainties related to scaling and system integration remain, potentially limiting widespread adoption in near future.

If successful, the proposed technology could pave the way to a novel generation of radically new devices (a slidetronic-based ferroelectric cube made of an array of fast, low energy consumption ferroelectric FETs). A potentially deep impact in the European agenda towards clean energy and more environmentally friendly devices is foreseen. The sort of research proposed here constitutes a field that must be explored, successfully or not, in order to produce a next generation of smart devices. Thus, the long term impact could be very high.

The long-term impact is extremely significant. The proposal provides a very explicit description of the transformative potential of the research in terms of technology in Europe, which will have a major impact in the economy, but also environment and society. Basically, the solutions and technology envisaged in the proposal will bring potential transformative positive effects in a very broad span of important sectors. Nevertheless, the major transformative can be circumscribed energy efficient and autonomous chips supporting the Green deal, by enabling self-powered vision market. This new technology has the potential to serve and monitor rural areas, supporting the both ageing communities and contributing to environment preservation. The potential creation of a new market inevitably will lead to the creation of new jobs.

Innovation potential: How adequate are the proposed measures for protection of results and any other exploitation measures to facilitate future translation of research results into innovations? How suitable are the proposed measures for involving and empowering key actors that have the potential to take the lead in translating research into innovations in the future?

*The technology has strong disruptive potential, offering >50x energy efficiency gains and potentially enabling new markets in self-powered vision sensors and neuromorphic edge AI. The proposal outlines a clear commercialisation roadmap with staged TRL milestones, IP filings, and a planned spin-off. Key actors, including early-career researchers and SME partners, are well-positioned and actively supported through IP training, venture mentoring, and standardisation involvement.
 The proposal lacks adequate detail discussion on how industrial partnerships will be secured beyond letters of intent.*

The proposal includes clear plans for protecting intellectual property, with plans to pursue patents related to the novel hybrid double-gate FeFET architecture and the application of sliding ferroelectricity in computing. It appropriately addresses dissemination through open science platforms while retaining core technological innovations. The strategy emphasizes engaging stakeholders and future industrial partners to translate advanced materials research into practical devices and edge-AI solutions. Nonetheless, the proposal does not present detailed pathways for transitioning from lab-scale prototypes to commercially viable products. Additionally, while industry engagement is mentioned, the proposal lacks detail on how partners will be integrated into development activities, such as technology validation, joint IP strategies, or early market testing to drive commercialization.

The research proposed here could become the foundation of novel disruptive devices based on cheap, clean and energetically efficient materials. The potential for translating the scientific research into innovation is very high. Intellectual protection strategies are well described and articulated in the form of patents and other strategies. KPIs, industry contacts and potential stakeholders are well identified. Thus, the potential for successful innovation is very high.

The potential to create new markets appears central to the this proposal, because it advances a disruptive technology which is desirable for the further development of AI driven devices, by increasing their performance and efficiency. The exploitation of the results has been clearly described and denotes a clear intention to support the future exploitation of the research results into real innovations. For that purpose, adequate measures were thought to better facilitate that transfers into the commercial sector. A clear timeframe involving IP and exploitation milestones, which include patent filing, licensing is tied up to the TRL levels to be travelled during the project. The measures to empower the key actors also reflect a clear vision on a successful translation of the research into innovations in future. This includes ECRs. SME and start-ups, regulatory bodies.

Communication and Dissemination: How suitable are the measures to maximise expected outcomes and impacts, including communication activities, for raising awareness about the project results' potential to establish new markets and/or address global challenges?

*The communication and dissemination plan is well-structured, with strategies for scientific, industrial, policy, and public audiences. It includes plans for open-access papers, invited talks, a summer school, industry days, and a public demo video. Open science is strongly embedded in the proposal. The use of fallback "communication sprints" adds credibility to outreach effectiveness.
 Some communication channels—like social media or citizen engagement (such as the hackathon)—may have limited reach and more concrete plans for amplification or maintaining the engagement with the outreach recipients are not discussed.*

The proposal outlines a solid communication and dissemination plan, including academic publications, conference presentations, open data sharing on platforms like Zenodo and GitHub, and public engagement activities. This demonstrates a commitment to open science and ensures visibility of scientific outcomes within both the research community and the broader public. However, the proposal does not explicitly include targeted measures aimed at industry stakeholders, investors, or potential end users. Additionally, it lacks a clearly defined strategy for communicating the societal and economic benefits of the technology, particularly in relation to its potential for low-power edge-AI applications and sustainability goals.

Dissemination and communications practices are correctly laid out, so that the visibility of the project results will be maximized. The technology proposed here, if successful, will give rise to new markets beyond current, well established knowledge, since nothing like this currently exists.

Very comprehensive list of measures to disseminate and communicate results, which goes far beyond the traditional routes based on publications and conference participations. The measures to involve the industry are commendable, as this will definitely raise the awareness of those stakeholders. The scientific community will benefit to summer schools, the industrial stakeholders will receive quarterly newsletters, invitations to industry days and access to booth and technical talks at industry-focused conferences. Social media outlets will be employed to reach the general public.

Criterion 3 - Quality and efficiency of the implementation

Score: 4.50 (Threshold: 3 / 5.00 , Weight: 20.00%)

The following aspects will be taken into account, to the extent that the proposed work corresponds to the description in the work programme:

Work plan: How coherent and effective are the work plan (work packages, tasks, deliverables, milestones, timeline, etc.) and risk mitigation measures in order to achieve the project objectives?

The work plan is highly coherent and logically structured, progressing from materials modeling through fabrication, reliability, modeling, and system benchmarking and exploitation. Dependencies and feedback loops are clearly articulated via a digital-twin workflow. Risk management is discussed with specific mitigations for high-priority risks (e.g. leakage, device non-linearity, IP conflicts), and fallback strategies. Though technically thorough, the methodology relies heavily on model predictions and simulation outcomes; fallback plans for key risks (e.g. device non-linearity or leakage, which are major issues) are brief, which is a shortcoming. The measurement technique to conduct experimental fJ characterization, such as achieving <10 fJ switching, a very difficult number to measure, is not discussed which is a major shortcoming.

The proposal presents a clear, well-structured work plan, divided into work packages covering key project aspects, including AI-enhanced modeling of sliding ferroelectricity, wafer-scale growth of bilayer hBN and MoS₂, development of hybrid double-gate FeFET devices, and benchmarking on TinyML workloads. Milestones and deliverables are quantified with specific targets, such as defined energy consumption levels and the number of programmable states in analog devices, demonstrating clarity and accountability. However, critical tasks, particularly integrating sliding ferroelectric hBN into hybrid FeFETs and fabricating large-scale device arrays involve significant technical uncertainties. While risks are discussed, mitigation measures for potential failures, such as achieving reliable device performance or wafer-scale uniformity, are only briefly described and lack detail on possible alternative materials, process adaptations, or simplified device architectures as alternative pathways.

The work plan is very well structured into work packages that flow seamlessly towards achieving the project objectives. Feasible and reasonable tasks, milestones and deliverables are clearly articulated, in a fashion that will permit monitoring the work flow along the project lifetime. Specific risks are identified, along with realistic risk mitigation measures or alternate pathways. The work plan overall looks feasible and solid.

The work plan is well presented, with a number of workpackages with well devised tasks to achieve the objectives proposed. The timeline for milestones appears realistic, and the same goes to the risk mitigation. From the outset of the project, the tasks are essentially based on predictive modelling and nanofabrication. This allows an scientifically informed development and improvement of understanding and performance of the materials under investigation. Understandability, when a reasonable level of control of the fabrication of the devices is achieved, their reliability will be evaluated to a point that the industrial partner gets engaged to perform a system benchmark evaluation. This work plan appears coherent and effective to achieve the project objectives. The risks within each WP were evaluated and the proposed mitigations appear reasonable.

Allocation of resources: How appropriate and effective is the allocation of resources (comprising person-months and other cost items) to work packages and consortium members?

The allocation of resources is generally well-balanced and aligns with each partner's core expertise. Key technical WPs receive the majority of effort, reflecting the complexity of modeling, fabrication, and characterization. Budget for open science, dissemination, and IP is clearly planned. Cost items, including consumables, cleanroom use, and travel, are justified. Resource flexibility in case of delays or unexpected tool downtime is mentioned but there is a lack of details on the reallocation protocols.

Resource allocation in the proposal is well-structured, with significant person-months assigned to critical experimental activities such as wafer-scale growth of bilayer hBN and MoS₂ and cleanroom fabrication processes. Advanced electrical characterization and reliability testing are appropriately staffed, ensuring that complex experimental challenges are adequately supported. Substantial effort is also dedicated to AI-enhanced atomistic modeling and the development of compact device models, reflecting the proposal's emphasis on predictive simulations to guide experimental work. The distribution of work aligns well with each partner's expertise and available infrastructure. However, the proposal allocates relatively limited resources, both in person-months and budget, to activities related to innovation management, industry engagement, and exploitation planning, which could limit the project's readiness for practical impact and successful market uptake.

The allocation of resources and proposed budget seems adequate in general. No major budget items that seem out of place, nor unreasonable, are identified. The budget justification seems appropriate to pursue the proposed research plan.

The allocation of resources is commensurate with the tasks set for each partner. Basically, all partners are requesting similar values for travel (meetings and conferences), which appears sensible. Not all partners request funds for publication, the reason behind is not explicitly provided. The weight of experimental work is reflected by the larger but acceptable budget request. A single partner requests a considerable larger allocation of resources, but that is commensurate with the higher running costs of the facilities to be used.

Quality of the consortium: To what extent do the consortium members have the necessary capacity and high quality expertise for performing the project tasks?

The consortium brings together strong, complementary expertise across the full innovation chain—from quantum modelling and ferroelectric fabrication to system benchmarking. Each partner leads tasks directly aligned with their proven strengths, and several have relevant patents or a track record of EIC projects. Industrial relevance is enhanced by commercial involvement in the wafer-scale deposition of proposed materials.

The consortium includes leading research institutions and universities with complementary expertise across critical domains, including AI-supported materials modeling, wafer-scale 2D materials growth, device fabrication, characterization, reliability testing, and benchmarking. The partners have substantial experience in European collaborative projects and bring specialized infrastructure, such as state-of-the-art cleanrooms and advanced metrology tools, which are essential for achieving the project's technical objectives. On the other hand, the consortium lacks direct expertise in semiconductor device manufacturing, and large-scale system integration, which can limit the translation of the innovative device concepts developed in the project into scalable, market-ready products.

The consortium is well designed, with team members that exhibit the correct set of expertises needed to attempt the proposed work plan. This is a carefully engineered proposal in general, and the team members are perfectly poised to tackle the challenges laid ahead of them.

The consortium is assembled around partners with proven track record in the research expertise to deliver all the objectives set in the proposal. The quality of expertise is appropriate to perform all tasks and the research capabilities will be all available at the partners. Hence, the project is underpinned by a solid materials theory approach, which is supported by modelling experts, who will work closely together with experts in nanofabrication. In principle this will ensure a swift and effective development of suitable materials for the next steps involving the device fabrication and testing.



Scope of the application

Status: Yes

Comments (in case the proposal is out of scope)

Not provided

Exceptional funding

A third country participant/international organisation not listed in [the General Annex to the Main Work Programme](#) may exceptionally receive funding if their participation is essential for carrying out the project (for instance due to outstanding expertise, access to unique know-how, access to research infrastructure, access to particular geographical environments, possibility to involve key partners in emerging markets, access to data, etc.). (For more information, see the [HE programme guide](#))

Please list the concerned applicants and requested grant amount and explain the reasons why.

Based on the information provided, the following participants should receive exceptional funding:

Not provided

Based on the information provided, the following participants should NOT receive exceptional funding:

Not provided

Use of human embryonic stem cells (hESC)

Status: No

If YES, please state whether the use of hESC is, or is not, in your opinion, necessary to achieve the scientific objectives of the proposal and the reasons why. Alternatively, please state if it cannot be assessed whether the use of hESC is necessary or not, because of a lack of information.

Not provided

Use of human embryos

Status: No

If YES, please explain how the human embryos will be used in the project.

Not provided

Activities excluded from funding

Status: No

If YES, please explain.

Not provided

Do no significant harm principle

Status: Yes

If Partially/No/Cannot be assessed please explain

Not provided

Exclusive focus on civil applications

Status: Yes

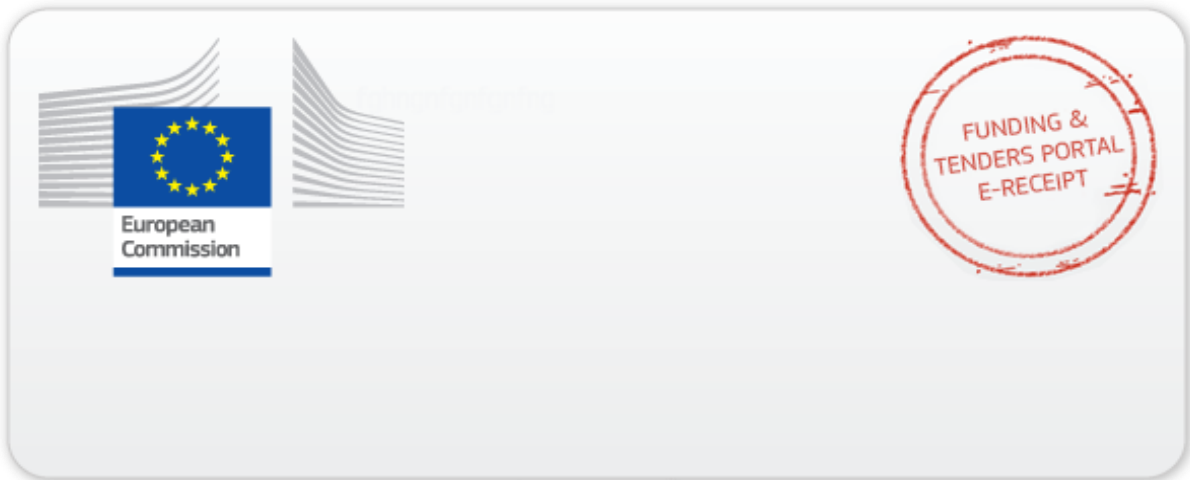
If NO, please explain.

Not provided

Artificial Intelligence

Status: Yes

If YES, the technical robustness of the proposed system must be evaluated under the appropriate criterion.



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