French engineering school in energy and numeric will coordinate a proposal for HORIZON-CL4-2027-01-MAT-PROD-02 and look for additional industrial partners to manufacture dry voltage and current transformers or rotating electrical machines.

Summary

Profile type	Company's country	POD reference
Research & Development Request	**France**	**RDRFR20261106031**
Profile status	**Type of partnership**	**Targeted countries**
PUBLISHED	**Research and development cooperation agreement**	**• All countries**
Contact Person	**Term of validity**	**Last update**
Enrico FRANZIN	**6 Nov 2026** **6 Nov 2027**	**9 Nov 2026**

General Information

Short summary

A consortium of 8 partners lead by a french engineering school is looking for HORIZON-CL4-2027-01-MAT-PROD-02 :
Dry voltage transformers using stacked E, L and I shaped electrical steel sheets for its magnetic cores ; Current transformers using either wounded ribbons or stacked washers based either on FeSi, FeNi or FeCo materials ; Rotating electrical machines for the electrical power generation and electromechanical actuation embedded in civil aircrafts or electrical and hybrid vehicules.

Full description

The research group has developed new laser processing techniques that contribute to the manufacturing and assembling of electrical steels and soft magnetic materials used in magnetic cores of electrical components and machines (inductors, transformers, electrical machines, sensors ….)

Laser technologies were introduced in the 80's for the 180° domains' refinement, leading to an average of 10% loss reduction. However, mainly Grain Oriented ES (GOES) have been laser processed successfully at a commercial level by European manufacturers, up to now without temperature withstanding properties, due to closure domains and thermal stresses induced by Continuous Wave Lasers (CWL).

Recent H2020 ESSIAL project (n°766437) investigated the laser technologies up to TRL 5-6, with prototypes, to avoid induced thermal stresses while achieving 20% loss reduction and more than 50% magnetic noise reduction for GOES at the end of the metallurgical route. Investigating further new techniques of such laser technologies, results were obtained and confirmed up to TRL 5 on both GOES and semi processed Special Alloys (SA) made of iron cobalt, with loss reduction up to 30-40%, along with a permeability increase of over 100% at a nominal operating.

They are part of a consortium that includes metallurgists and magnetic materials experts in France, laser experts and manufacturers in Belgium, experts on microscopic and magneto-optical tools to observe the microstructures of materials in Germany and experts in magnetostriction in Finland. The consortium already includes 8 partners and the first project structuration and proposal has been prepared.

Recent advancements and innovations on laser processes have been looked at to be implemented at different non-conventional stages inside the metallurgical steps. PLASMA pushes the limitations forward by targeting higher TRL up to TRL 7 investigating innovative advanced pulsed laser processes interacting with metallurgy and magnetism applied to various materials (ES & SA). It aims at discovering and adapting laser processes to grades at different beneficial manufacturing steps (before recrystallization & final coating), thereby overcoming limitations that persist today, even with the GOES, to reach expected impacts on the magnetic permeability, energy efficiency and power to mass ratio.

As a consequence, the consortium has decided to propose an Innovation Action type of european project for the HORIZON 2027 program HORIZON-CL4-2027-01-MAT-PROD-02 : Advanced manufacturing for key products (IA) (Made in Europe partnership).
This project aims at making progress on the new laser techniques to level up the TRL from 5 to 7. To do so, they need to complete the list of partners inside the consortium to cover the whole value chain from the metallurgical steps towards the use of electrical steels stacked inside electrical components or/and machines.

Advantages and innovations

The main advantages/outcomes of the technologies are:
- Energy and power savings : This process makes it possible to decrease both the iron losses and the reactive power needed due to magnetic reversal mechanisms up to 20% and even more for a large range of working conditions
- Control of vibrations and magnetic noise : decrease of both the magnetic induced vibrations and noise up to 50%.
- Reduction of global cost : Energy savings during the whole life cycle lead to reduction of global cost more than 20%.
- Thermal retention properties : The USPL technique provides thermal retention capabilities not achievable by the standard surface laser treatment in the industry.
- Tailor made process usable and useful before thermal annealing or/and coating : The laser parameters and patterns can be adjusted for each alloy and grade and adapted to the flux working condition.
- high quality mass production capabilities : The process provides thin, deep and clean grooves and is compatible with mass production thanks to the high repetition frequency of pulses.

Application field: magnetic components: choke inductors, current and voltage transformers / electrical machines: motors and generators / metallurgy of electrical steels, ferromagnetic alloys / surface laser treatments.

Technical specification or expertise sought

They would like to strengthen the project proposal by inviting one SME (private companies) to join the consortium as industrial partners whose main activities are the design and manufacturing of :
1) Dry voltage transformers using stacked E, L and I shaped electrical steel sheets for its magnetic cores.
2) Current transformers using either wounded ribbons or stacked washers based either on FeSi, FeNi or FeCo materials.
3) Rotating electrical machines for the electrical power generation and electromechanical actuation embedded in civil aircrafts or electrical and hybrid vehicles.

Stage of development

Under development

Sustainable Development goals

- **Goal 7: Affordable and Clean Energy**
- **Goal 9: Industry, Innovation and Infrastructure**
- **Goal 12: Responsible Consumption and Production**

IPR Status

IPR granted

IPR Notes

initial NDA and Consortium Agreement to be signed
possibility to negotiate a commercial agreement to have the exclusive right to exploit part of the patent for new products.

Partner Sought

Expected role of the partner

industrial end-users

Type of partnership

Research and development cooperation agreement

Type and size of the partner

- **SME 11-49**
- **SME 50 - 249**

Call Details

Framework program

Horizon Europe

Call title and identifier

HORIZON_HORIZON-CL4-2027-01-MAT-PROD-02 Advanced manufacturing for key products (IA) (Made in Europe partnership)

Submission and evaluation scheme

Single phase

Anticipated project budget

between 6 and 8 M€ at maximum

Coordinator required

No

Deadline for EoI

24 Dec 2026

Deadline of the call

2 Feb 2027

Project duration in weeks

208

Web link to the call

https://cordis.europa.eu/programme/id/HORIZON_HORIZON-CL4-2027-01-MAT-PROD-02

Project title and acronym

PLASMA: TAILORED PULSED LASER PROCESSING OF SOFT MAGNETIC ALLOYS PROPERTIES

Dissemination

Technology keywords

- **02002004 - Erosion, Removal (spark erosion, flame cutting, laser, ..)**
- **02007010 - Metals and Alloys**
- **02007011 - Non-ferrous Metals**
- **02007015 - Properties of Materials, Corrosion/Degradation**
- **01002006 - Magnetic and superconductor materials/devices**

Market keywords

- **08001007 - Coatings and adhesives manufactures**
- **08001012 - Speciality metals (including processes for working with metals)**
- **09001005 - Motor vehicles, transportation equipment and parts**
- **03005 - Laser Related**

Targeted countries

- **All countries**

Sector groups involved

- **Energy-Intensive Industries - Materials**