Annex 1: Future Cooperation in AI Research, Development, and Infrastructures

Introduction

Artificial Intelligence (AI) is evolving to become one of the most important and most consequential key technologies of our time. While AI is already transforming economies and societies worldwide, its evolution is still in its infancy and characterized by a remarkable dynamic. As a consequence, AI holds great potential for economic growth as well as individual and societal well-being, but also comes along with risks for human rights, fundamental freedoms, democracy, and the environment. Designing and developing AI in such a way that it serves the good of society and reaching technological sovereignty in AI are therefore of vital importance.

At the same time, global competition for AI leadership is intensifying. Recent developments surrounding, e.g., the Stargate project in the USA or DeepSeek in China make this abundantly clear. This happens against the backdrop of fundamental changes in the global geopolitical and economic landscape, which make new modes of value creation necessary and also entail diverging visions for the design and governance of key technologies such as AI.

France and Germany share the vision, articulated, e.g., in the AI Action Summit in Paris in February 2025 and advocated by many other countries, that AI should be developed in a human-centric manner to serve the good of society – meaning that we strive for secure, trustworthy, and sustainable AI that harnesses the opportunities, limits the risks, and protects human rights, fundamental freedoms, and the environment.

We also share an understanding that France and Germany with their strong and long-standing political, economic, societal, and scientific ties – re-emphasized in the Treaty of Aachen of January 22, 2019 – have a leading role to play in realizing this vision of developing and using AI for the common good, also contributing to Europe's leadership in that area of sovereign importance.

French-German Partnership on AI

The French-German partnership already involves a strong cooperation in the field of AI. This was emphasized, in particular, in a joint declaration, signed on October 16, 2019, on establishing a French-German AI Research and Innovation (R&I) Network by strengthening existing cooperation structures, creating a joint ecosystem on AI, and adopting a common position regarding AI policy. The joint declaration has resulted, most notably, in two joint calls of BMBF and MESR, published in 2020 and 2022, that led to the funding of 29 projects with a total amount of approximately 25 million euros. In addition, many grassroots initiatives have been initiated and strengthened in the past years. The most recent ones include the Call for Action from French and German Research and Industry Stakeholders towards an industry-led French-German AI Roadmap for Europe (January 2025).
The French-German partnership on AI has also the potential to boost European initiatives in the field, namely by issuing joint positions and ideas at European level, and also through the testing of innovative ways to pool resources for scientists developing and applying AI in the EU and drive the advancement of AI in and through science in Europe.

The dynamic AI evolution, exemplified by the publication of ChatGPT in November 2022, calls for a renewal and amplification of the French-German AI partnership in the area of research and innovation.

The Way Forward

To continue and deepen their partnership in the field of AI research and innovation, France and Germany agree to pursue and support initiatives in the following fields of action:

1. **AI Ecosystem**: The French-German AI R&I ecosystem involves various partnerships between French and German researchers, universities, research institutions, and other stakeholders, including start ups, smes and industry. These partnerships are the outcome of many grassroots activities as well as joint policy initiatives. Recent years have seen a notable expansion of this ecosystem, resulting from national initiatives – like the funding of the French AI clusters and the German service centers-, European initiatives, like the AI factories, and specific cooperation projects. Key actors of the ecosystem are INRIA as coordinator of the French National Artificial Intelligence Research Network and the newly established AI clusters on the French side and DFKI and the other Centers of Excellence in AI Research ("Competence Centers") on the German side. It is also to be underlined that France and Germany have initiated a strategic dialogue with a view to strengthen synergies among industry, research and innovation ecosystems, in order to launch a coalition of the willing aiming at developing a joint French-German AI industry-led roadmap identifying actions and commitments from stakeholders. Fraunhofer Gesellschaft and Inria are jointly facilitating this process.

France and Germany commit to further strengthening the French-German AI R&I ecosystem via

a. *establishing an ecosystem **governance** enabling strategic scientific foresight and more regular exchanges & coordination;*
b. *organizing on a regular basis **joint events** to facilitate the exchange between researchers and institutions on scientific results, best practices, current challenges, and future areas of cooperation – with a joint workshop organized as part of the All Hands Meeting 2025 of the German Centers of Excellence in AI Research in Saarbrucken in early November 2025 as a first example;*
c. *improving the **presentation** of the French-German cooperation on AI, e.g., via a joint website and a repository of success stories.*

2. **AI Talent**: While data, compute, and algorithms fuel the AI evolution on the technical level, people are at the steering wheel, and ought to be in the future to realize the vision of a human-centric and public good-oriented AI. The competition for AI talent is fierce. To remain competitive in this competition for talent, France and Germany must bundle their strengths. Various initiatives already exist, like the European networks ELLIS and CAIRNE borne by French and German institutions, the "AI Grid" as well as joint (under-)graduate, PhD, or exchange programmes established between universities and/or research institutions in France and Germany, e.g., in the context of the joint calls of BMBF and MESR or as part of the on-going cooperation between the French AI clusters and INRIA and the German Centers of Excellence in AI Research.

   France and Germany commit to strengthening existing AI talent programmes as well as supporting the establishment of new ones, driven by universities, research institutions, and existing networks.

3. **AI Infrastructure**: Compute infrastructure has become an essential facility for AI R&I. Many (though by no means all) recent breakthroughs in the field of AI can be attributed to a scale-up of generative AI models and the corresponding increase in computing resources used to train these models. Improving the availability and access to AI-ready compute infrastructure is therefore a central goal of the French, German, and European AI strategies. The Julich Supercomputing Center (JSC) and the TGCC computing centre at the CEA will host the first European exascale supercomputers, JUPITER and Alice Recoque, established as part of the EuroHPC Joint Undertaking. In addition, three of the newly established European AI Factories are built in France ("AI2F" in Paris) and Germany ("HammerHAI" in Stuttgart, "JAIF" in Julich). Various collaborations between France, esp. GENCI and CEA, and Germany, esp. the Gauss Centre for Supercomputing,

on supercomputing exist. The collaboration between the French and German AI Factories is already planned.

France and Germany commit to deepening existing collaborations in supercomputing, especially between the new AI factories, and to identifying possibilities for coupling the two exascale supercomputers to a virtual AI gigafactory.

4. **AI strategic projects**: The joint French-German AI R&I ecosystem already comprises a multitude of fruitful research partnerships, not least as a result of the two joint calls by BMBF and MESR, which have initiated potentially long-standing partnerships, both hardware and software. The results stemming from the projects jointly supported by the two ministries should be better showcased and valorized, for instance during a dedicated regular event. Furthermore, the scientific cooperation between France and Germany has the potential to shape the direction of AI development on eye level with leading players like the United States and China. Potential areas for future joint research are, e.g., domain-specific (generative, multimodal) agentic and reasoning models, AI & cybersecurity, AI for scientific discovery, resource-sensitive AI, AI Chips as well as AI applications in manufacturing, robotics, health, or earth observation.

   France and Germany commit to establishing a process to jointly identify scientific priority domains with the goal of setting up strategic projects.

Annex 2: Position paper on the French-German Cooperation in Fusion Energy Research

Introduction

Fusion has the disruptive potential to provide a safe, cost-effective and sustainable solution to European and global energy needs. This energy source has recently aroused a renewed enthusiasm in many countries, now engaged in a world race where competitiveness is key and where the EU cannot afford to lag behind, as stated in the Draghi report. There are several initiatives with projects which use various reactors technologies.

Before the industrialisation and commercialisation and whatever the fusion approach used, going towards a first future pilot fusion plant requires significant research and development to strategically increase the Technology Readiness Level (TRL) of fusion technologies. This includes key areas for instance developing neutron resilient materials, tritium breeding and fuel cycle technologies, plasma power exhaust and heat extraction systems, and remote handling solutions. Most of them are relevant for inertial confinement fusion (ICF) and magnetic confinement fusion (MCF).

France and Germany share the vision that collaborative research efforts between the two countries are necessary to combine expertise and resources to tackle the technical and scientific challenges of fusion on a larger scale.

In this context, a workshop was held on April 3, 2025 in Bonn. This workshop brought together representatives from BMFTR, DGRI, as well as key players from the French and German research ecosystems working on both MCF and ICF. The goals of this meeting were in particular to share the national priorities in terms of fusion energy, review existing research collaborations, and identify opportunities to strengthen them or establish new ones. The main conclusions and follow-up actions are presented below.

Overview on National Strategies in Fusion Research

France and Germany are two key actors in the international magnetic fusion landscape.

For many years, France has been strongly involved, through its scientific community, in the EUROfusion consortium, its research platforms, such as the WEST tokamak, and of course as the host country of the ITER project. Today, the French contribution focuses on ITER preparation and future operation, and in particular on the study of the interface between plasma and internal components to develop suitable configurations. Through the so-called France 2030 plan, France supports also two start-ups developing stellarator and laser fusion concepts, and a research and innovation programme which aims at developing new high-temperature superconducting materials to meet magnetic fusion requirements and tomorrow's energy and societal challenges. Beyond fission nuclear energy, which is one of the keys of the French balanced energy mix to achieving carbon neutrality by 2050, France considers it essential to explore all possible avenues towards new technological solutions that can contribute to the production of low-carbon energies, which obviously include nuclear fusion.

Germany is already one of the leading players worldwide in the field of MCF, especially in stellarators, but with regard to ICF, there are still comparatively new activities. A first research program “Fusion 2040” was published in 2024, covering both MCF and ICF. The areas addressed include the further development of technological approaches and the establishment of a fusion ecosystem. Consequently, fusion research was also mentioned as a priority for the new German government and BMFTR. The goal is to construct the first pilot fusion plant capable of producing net energy in Germany. To ensure this goal can be achieved, a fusion ecosystem needs to be built. This comprises levering synergies between institutions, strengthen technology transfer, hubs and test facilities for individual technologies, open to industry. The challenges on the path to energy production using fusion can only be overcome through close cooperation between politics, science and industry. Germany will promote the training and further education of highly qualified experts and to facilitate the networking of national and, within frameworks of cooperation, international actors like France.

Existing French-German cooperation in the fusion energy field

The French-German partnership already involves a significant cooperation in the field of fusion energy.

The first link between the two countries is through ITER. France and Germany as European Countries are part of this international project, which serves as a cornerstone of the EU's path to fusion energy.

Beyond ITER, a recent example of French-German association is the renewal in March 2025 of the scientific and technical cooperation agreement between CEA and KIT for another 5 years. These two organisations, major fusion

energy research players in both countries, have been collaborating for more than 50 years on strategic subjects such as fusion energy.

A number of French-German research collaborations on MCF have already taken place or are underway within the EUROfusion framework which defines, coordinates and funds fusion research activities on behalf of the European Commission's Euratom programme. These collaborations concern different research subjects like code development, tokamak exploitation with joint experiments, plasma-wall interaction and exhaust, breeding blankets, and materials development. Beyond the EUROfusion framework, two bilateral agreements already exist, one on plasma control system and another one on gyrotron qualification. All these research cooperation involve CEA in France and the major research players in Germany, i.e. JZH, KIT and IPP.

Beyond collaboration on research field, a strong and more industrial collaboration exists between Thales, KIT and other European partners for nearly three decades on gyrotron development, which guarantees the supply of efficient and reliable European gyrotrons for the upcoming demand on high power gyrotrons for MCF.

In the field of ICF, a collaboration already takes place inside the EU project THRILL (2023-2027), which involves notably CNRS, HZDR and GSI. The goal of this project is to overcome bottlenecks in high-energy/high-repetition rate laser technology. Another EU project, which include CNRS and German partners, deals also with ICF related topics like foam materials for fusion, high pressure chemistry and lasers.

Identified topics for a strengthening of the French-German cooperation in the fusion energy field

The Bonn workshop in April 2025 enabled representatives from both countries to share their analysis of the technological hurdles that needed to be overcome to move towards decarbonised electricity production using fusion energy and to present their skills and experimental resources for tackling them.

Following discussions at the workshop, both parties identified some research priorities topics where close French-German cooperation would be most relevant.

For MCF, the two topics are breeding blankets and code development. The breeding blanket is the most novel and unproven system in a future fusion power plant and has strong needs on design by analysis, manufacturing, and testing of prototypes both in cold and nuclear conditions. For nuclear code development, as in nuclear fission where there is yet a strong international collaboration, needs exist at every level: nuclear data measurements and evaluations, code developments, verifications, benchmarking, share of computational resources, etc.

For ICF, the two topics concerns the fields of laser (broadband, high-repetition, high energy lasers) and specialised optics, two fields which need research and development to go towards a laser-driven fusion reaction allowing the electricity production. ICF for energy production requires a laser driver at the Megajoule level with a 10-20 Hz repetition rate with an increased bandwidth to mitigate hydrodynamic and laser-plasma instabilities. New generation optics are needed to sustain the increased shot rate at high power, damage obtained over lifetime is a key parameter of the economical equation of an ICF reactor.

Beyond research topics, the two parties shared the needs for training specialists in fusion energy that could be a possible future candidate for bilateral activities through training, bilateral summer schools, courses, etc.

In addition, the two delegations identified the importance of maintaining a sizeable and coordinated access to research infrastructures which are relevant for fusion technologies, such as GANIL-NFS, European XFEL, IFMIF-DONES etc.

Way forward

Based on the April 2025 workshop outcomes, France and Germany agree to further strengthening their Fusion Energy Research ecosystem through:

- **Developing by the end of 2025 an overarching MoU between MESR and BMFTR, on general principles for a strengthened cooperation;**
- **Enabling cooperations based on the MoU between relevant France and German research institutions on specific research fields, e.g. breeding blankets and specialised optics in order to boost the maturation of these technologies essential for MCF and ICF fusion energy development;**

- **Continuing exchanges between MESR and BMFTR on subjects present in both countries which are relevant for the fusion energy research and development (e.g. governance, training and test infrastructures).**

Annex 3: Joint Statement on Closer Exchange in the Field of Disruptive Innovation

Disruptive innovations are essential for Europe’s future competitiveness and prosperity. They drive technological progress, create new markets, and help address global challenges such as carbon capturing, new materials, decentralised AI processes and cures for emerging diseases.

The French ministry for higher education and research (MESR) and the German ministry for research, technology and space (BMFTR) recognise the strategic importance of fostering disruptive innovation for the benefit of France, Germany, and the European Union as a whole and propose hereby to cooperate closely to advance this strategic area.

They reaffirm their strong commitment to shaping Europe's technological future by jointly fostering breakthrough innovation and deep tech. Building on the shared vision expressed by their respective head of states and government, both ministries recognise that technological sovereignty is a strategic imperative for Europe in the 21st century. They are determined to accelerate their bilateral and European efforts in key sectors where global leadership is essential and where Europe's competitiveness and autonomy must be safeguarded. These include artificial intelligence, quantum computing, clean and secure energy, biotechnology, space, semiconductors, and defence technologies as examples of possible cooperation in the future.

France and Germany have each developed their own approaches to supporting disruptive innovation, reflecting their unique strengths, priorities, and traditions. The MESR and the BMFTR acknowledge that these different experiences offer valuable opportunities for mutual learning and inspiration.

In France, the Deeptech Plan, launched six years ago, has laid the groundwork for a dynamic ecosystem of high-risk, high-potential innovation, with strong public support for start-ups emerging from frontier science at intensive research universities and national research organisations. In Germany, the creation of SPRIND —the Federal Agency for Disruptive Innovation— six years ago stands as a unique European initiative inspired by the ARPA model, enabling bold, high-impact experimentation with a truly European perspective. Together, these efforts offer a powerful foundation to scale up deep tech innovation across the continent.

With this in mind, the ministries express their shared intention to strengthen their exchange in the field of disruptive innovation. Both ministries are committed to sharing knowledge, experiences, and best practices more closely, and to exploring how they can work together more effectively in this important area.

The MESR and the BMFTR, together with interested and relevant ministries and agencies, will launch a consultation process after summer 2025, with the view to prepare concrete cooperation actions by spring 2026**.** In the meantime, the ministries have agreed to initiate joint foresight actions in the field of key technologies.

While this stronger partnership on disruptive innovation public policies is gaining momentum, the ministries are delighted that closer exchanges are already taking place. The Memorandum of Understanding between Bpifrance and SPRIND will enable these two institutions to deepen their collaboration and implement concrete cooperation actions. In addition, a new task force will be set up to reflect on new ways to support disruptive innovation in France, paving the way for the development of Franco-German initiatives in this field.