

Letter to the EU Laser Fusion community

Dear colleagues,

With this email we would first of all like to thank all of you for the interest expressed in the program for European Laser Fusion that we are trying to establish.

As all of you already know, after the record shot at the NIF in August 2021, we sent our first letter to the community in September 2021 with an invitation to join and support this initiative. We received an excellent response from many countries, with more than 100 signatures (Interested person can still sign the initiative going in the following link <https://forms.gle/43Bj33u3LnLKp5ay7>). In parallel, several other initiatives have been organised, which seek political and financial support for the European and national institutions. In this second letter, we want to inform you about these actions, the status of the project and the initiatives planned in the coming months.

The main goal of these initiatives is to bring together the European community working on laser fusion, to coordinate our actions with European research groups and industry which have similar scientific and technological objectives, and to demonstrate to the decision makers that our community is sufficiently large and mature to carry out an ambitious, large-scale project with a strong societal impact and with many interesting mid-term spin-offs.

- Dissemination

One of our first actions was to disseminate and communicate the record results obtained by our US colleagues to the EU community at different levels. For this we prepared and published two papers that are listed below.

- S Atzeni, D Batani, CN Danson, LA Gizzi, M Perlado, M Tatarakis, V Tikhonchuk, L Volpe.
“An evaluation of sustainability and societal impact of high-power laser and fusion technologies: a case for a new European research infrastructure”, High Power Laser Science and Engineering 9, <https://doi.org/10.1017/hpl.2021.41>
- S Atzeni, D Batani, CN Danson, LA Gizzi, S Le Pape, JL Miquel, M Perlado, RHH Scott, M Tatarakis, V Tikhonchuk, L Volpe, “Breakthrough at the NIF paves the way to inertial fusion energy”, Europhysics News 53 (1), 18-23, <https://doi.org/10.1051/epn/2022106>

Please distribute these papers to your colleagues and invite them to join our community.

- Proposition for EU support

In November 2021 we wrote a first letter (1_hiper_to-eurofusion_28-12-2021.pdf) to A.D. Donne and A. Fasoli the coordinators of the EUROfusion consortium with an invitation to start a discussion on possible actions by the EU in support to our project on Inertial Fusion Energy (IFE) via direct drive. The letter ends “We would be happy to discuss details of our vision of the European IFE roadmap and to provide a detailed preparatory work for the next phases of this process”. This letter was warmly received by the EUROfusion coordinators (eurofusion_hiper_01-12-2021.pdf) and after our second letter (2_hiper-eurofusion_17-01-2022.pdf), we had a high-level discussion with the three EUROfusion leaders A.D. Donne, A. Fasoli and R. Wolf on the 10th of March 2022. In this meeting (Talk IFE EUROfusion_10-03-2022.pdf) we expressed our intention to promote a new program for direct drive IFE in Europe in coordination with the international ICF community in the USA and Asia. Although EUROfusion is not considering a to increase the financial support of our initiative, the EUROfusion coordinators have confirmed the current ICF quota within the Enabling Research initiative and proposed their support for actions at the European level, as follows:

- Solicit reconsideration of the HiPER project onto the ESFRI roadmap as a major step for recognition of the importance of the IFE project in the European landscape.
- Propose an ERC Synergy project for the financial support of the conceptual design of a European IFE laser facility, and research-community development.
- Solicit financial support for complementary research projects at the national level, political support from the governmental organisations, and collaboration with private companies.
- Promote the recent achievements in laser fusion and research programs at the European and national levels in the magnetic fusion community and other research and technology organisations that might have common interest either for clean energy production or for other spin-off technologies.
- Further develop international collaborations.

- **The USA program**

The US government is preparing a large scale 5-year program aiming to promote fusion energy research and technology jointly with fusion industry and towards commercial exploitation of fusion technologies. The laser fusion community in the US have already organised three meetings (one in November 2021 and two in February 2022) to discuss the major challenges and needs in the coming years. There is a high probability that a first national IFE program in USA will be announced at the end of this year. It will include both the indirect and direct drive approaches and alternative schemes such as magnetized spherical implosions and MagLIF.

Although the financial support will be provided to the US laboratories, universities and private companies, international collaborations are likely, and we are actively exploring this possibility. One particular initiative concerning international collaboration between the public and private sectors, is the T-STAR project which aims to construct a high repetition 10 kJ laser facility at the University of Texas in Austin. This is being led by a private company Focused Energy (www.focused-energy.world) and may be operated by LaserNetUS.

- **Next meeting**

After this first preparatory period, there is a need to bring all the community together. The next opportunity is the Direct Drive Fast Ignition Workshop (17th DDFIW ddfiw2022.etsiae.upm.es) organised at the Technical University of Madrid from Tuesday 3rd to Thursday 5th of May. The 17th DDFIW will be followed by a EUROfusion meeting related to the project "Advancing shock ignition for direct-drive inertial fusion."

Please disseminate this information among your colleagues.

Registration and abstract submission are open until the 1st of April.

- **Further actions**

- A web page for the European IFE project is under preparation.
- All relevant documents and information will be available on the site.
- Please send us any complementary information related to the project, to the community building and networking.
- A collaboration agreement between the partners expressed interest in the HiPER+ initiation letter is under preparation.
- Within Laserlab-Europe an Expert Group in ICF/IFE is being established which will provide some level of funding for networking, seminars and meetings. A website has been created which will be populated in due course: <https://www.laserlab-europe.eu/aisbl/expert-groups/laser-driven-icf>

An initiative by (alphabetical):

Stefano Atzeni, Dimitri Batani, Colin Danson, Leo Gizzi, Jean-Luc Miquel, Sebastien le Pape, Manolo Perlado, Robbie Scott, Michael Tatarakis, Vladimir Tikhonchuk and Luca Volpe.