Joint IAEA/ENEA/EMFCSC Fusion School

The school is hosted at the historic Ettore Majorana Foundation and Centre for Scientific Culture (EMFCSC), an institution renowned for fostering international scientific exchange since its establishment in 1962 by physicist Antonino Zichichi. Set within the medieval hilltop town of Erice, Italy, the EMFCSC has become a global hub where leading researchers, educators, and young scientists gather to share knowledge and advance emerging fields of science and technology.

The international school on fusion at the EMFCSC was established in 1972 and has since played a pivotal role in training generations of fusion researchers. This year's school is organized in collaboration with the International Atomic Energy Agency (IAEA) and Italy's National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA).

The school combines high-level lectures from leading experts with the unique interdisciplinary spirit that has characterized the EMFCSC for more than sixty years. Participants will gain not only technical knowledge but also the opportunity to engage in open dialogue across disciplines, generations, and national borders, reflecting the school's mission to cultivate the next generation of scientists, engineers, and leaders in fusion research.

Dates: 7–12 June 2026
Location[1]: Ettore Majorana Foundation and Centre for Scientific Culture, Erice, Italy
Sponsors: IAEA, ENEA, EMFCSC, FuseNet

Expected Participants: 30

Key Deadlines and Dates

17 April 2026	Deadline for submission of applications via InTouch+ platform (https://intouchplus.iaea.org) for participants requesting financial support, covering school activities, meals, and accommodation at the EMSFC
30 April 2026	Notification of acceptance of registration and award of grants
8 May 2026	Deadline for submission of applications via the InTouch+ platform for participants not requesting financial support

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[1] Information on how to reach the EMFCSC is available at: https://centromajorana.it/directions.html

Course Title: Fundamentals of Magnetic Confinement Fusion Design and Technology

Course Directors: Matteo Barbarino (IAEA), Paola Batistoni (ENEA)

Course Description

The Joint IAEA/ENEA/EMFCSC Fusion School provides a unique, advanced-level training program in fusion energy. This course integrates physics, cutting-edge technology, and engineering practices essential for the realization of fusion power plants. Participants will explore interdisciplinary approaches, addressing the challenges of plasma physics, magnetic confinement, material science, and power plant integration.

A particular emphasis is placed on understanding the intricate relationship between magnetic fields and machine size, a pivotal aspect of magnetic confinement fusion design. The curriculum delves into how magnets technology can influence engineering strategies and material selection, shaping the overall design of fusion power plants. Through lectures, interactive workshops, and case studies, participants will gain comprehensive insights into the future of fusion energy development.

Key focus areas include:

- Integration of plasma physics, materials science, and engineering principles.
- Magnetic field strength, scalability, and size in tokamaks.
- Tritium management and self-sufficiency strategies.
- Advances in divertor technology and power exhaust solutions.
- Regulatory, safety, and environmental considerations for commercialization.

Lecturers

Bethany Colling	UK Atomic Energy Authority, United Kingdom
Dario Cruz	FuseNet
Christian Day	Kyoto Fusioneering
Pietro Alessandro Di Maio	University of Palermo, Italy
Stephanie Diem	University of Wisconsin–Madison, United States of America
Achilleas Evangelias	Renaissance Fusion
Gianfranco Federici	Eurofusion
Francesca Ferrazza	Eni
Jiangang Li	Institute of Plasma Physics Chinese Academy of Sciences, China
Simon McIntosh	ITER Organization
Luigi Muzzi	ENEA, Italy
Gian Mario Polli	DDT, Italy
Lee Packer	UK Atomic Energy Authority, United Kingdom
Diego Pereira	Renaissance Fusion
Alessandro Spagnuolo	Eni
Rosaria Villari	ENEA, Italy
Marco Wischmeier	Eurofusion
Hartmut Zohm	Max Planck Institute for Plasma Physics, Germany

Participation and Registration

All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State or invited organization, participants are requested to submit their application via the InTouch+ platform (https://intouchplus.iaea.org) to the competent national authority (Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) or organization for onward transmission to the IAEA by **17 April 2026**, following the registration procedure in InTouch+:

1. Access the InTouch+ platform (https://intouchplus.iaea.org):
   - Persons with an existing NUCLEUS account can sign in to the platform with their username and password;
   - Persons without an existing NUCLEUS account can register here.

2. Once signed in, prospective participants can use the InTouch+ platform to:
   - Complete or update their personal details under 'Complete Profile' and upload the relevant supporting documents;
   - Search for the relevant event under the 'My Eligible Events' tab;
   - Select the Member State or invited organization they want to represent from the drop-down menu entitled 'Designating Authority' (if an invited organization is not listed, please contact InTouchPlus.Contact-Point@iaea.org);
   - If applicable, indicate whether financial support is requested and complete the relevant information (this is not applicable to participants from invited organizations);
   - Based on the data input, the InTouch+ platform will automatically generate the Participation Form (Form A) and/or the Grant Application Form (Form C);
   - Submit their application.

Once submitted through the InTouch+ platform, the application, together with the auto-generated form(s), will be transmitted automatically to the required authority for approval. If approved, the application, together with the applicable form(s), will automatically be sent to the IAEA through the online platform.

NOTE: The application for financial support should be made, together with the submission of the application, by **17 April 2026**.

For additional information on how to apply for an event, please refer to the InTouch+ Help page. Any other issues or queries related to InTouch+ can be sent to InTouchPlus.Contact-Point@iaea.org.
Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Participants are hereby informed that the personal data they submit will be processed in line with the Agency's Personal Data and Privacy Policy and is collected solely for the purpose(s) of reviewing and assessing the application and to complete logistical arrangements where required. The IAEA may also use the contact details of Applicants to inform them of the IAEA's scientific and technical publications, or the latest employment opportunities and current open vacancies at the IAEA. These secondary purposes are consistent with the IAEA's mandate. Further information can be found in the Data Processing Notice concerning IAEA InTouch+ platform.

Expenditures and Grants

The estimated cost of attendance is around €1000 per student, covering school activities, meals, and accommodation at the EMFCSC, for a limited number of selected participants.

The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance, covering school activities, meals, and accommodation at the EMFCSC, for a select number of participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the event. **Priority for financial support will be given to applicants from Southern Europe and Africa.**

Master's students enrolled at universities in EUROfusion member states (see: https://euro-fusion.org/eurofusion/members/) are eligible to apply for travel and subsistence support through FuseNet.

Details on eligibility criteria and the level of financial support are available at: https://fusenet.eu/education/support/educational-events.

The application for financial support should be made, together with the submission of the application, by **17 April 2026.**

<div align="center">**Programme**</div>

Day 0 – Sunday, 7 June

Registration of participants, and coordination meetings with school directors, organizers and faculty

Day 1 – Monday, 8 June

08:00–09:00 – Breakfast

09:00–10:30 – Opening Session

- Welcome by Ettore Majorana Center
- Welcome by IAEA
- Welcome by ENEA (A. Dodaro)
- Welcome by School Directors (P. Batistoni, M. Barbarino, L. Zichichi)
- Introduction of faculty and participants (All)
- Overview of the School objectives and structure (P. Batistoni)

10:30–11:00 – Coffee Break

11:00–12:30 – Introduction to Fusion Energy

- The role of fusion in the global electricity outlook (M. Barbarino)
- Historical progress and current technological landscape (H. Zohm)

12:30–14:00 – Lunch

14:00–15:30 – Introduction to Fusion Energy (cont.)

- Enabling technologies for fusion and the EU fusion development strategy (G. Federici)

15:30–16:00 – Coffee Break

16:00–17:30 – Roundtable

Fusion state of play
(M. Barbarino with P. Batistoni, G. Federici, J. Li, H. Zohm)

20:00–22:00 – Welcome Dinner

Day 2 – Tuesday, 9 June

08:00–09:00 – Breakfast

09:00–10:30 – Plasma Physics, Magnetic Fields and Machine Size

- Tokamak operation basics, plasma stability, beta limits, magnetic fields (H. Zohm)
- Field strength vs. power density, structural and thermal constraints, case studies BEST/CFEDR (J. Li) (virtual)

10:30–11:00 – Coffee Break

11:00–12:30 – Plasma Physics, Magnetic Fields and Machine Size (cont.)

- Stellarator operation basics, plasma stability, beta limits, magnetic fields (A. Evangelias)
- Materials for magnets, scalability and industrialization (L. Muzzi)

12:30–14:00 – Lunch

14:00–15:30 – Discussion Session

High-field vs. large-volume design philosophies
(P. Batistoni with A. Evangelias, L. Muzzi, H. Zohm)

15:30–16:00 – Coffee Break

16:00–17:30 – Student Presentations (short talks)

Evening: Free time

Day 3 – Wednesday, 10 June

08:00–09:00 – Breakfast

09:00–10:30 – Power Exhaust and Divertor Technology

- Heat flux management challenges, scenarios development (M. Wischmeier)
- Case study DTT (G. Polli)

10:30–11:00 – Coffee Break

11:00–12:30 – Fusion Neutronics and Engineering

- Neutronics and nuclear aspects (R. Villari)
- Activation and transmutation (L. Packer)

12:30–14:00 – Lunch

Afternoon: Free time

Day 4 – Thursday, 11 June

08:00–09:00 – Breakfast

09:00–10:30 – Extended Fuel Cycle Engineering

- Fuel cycle architecture, blanket integration, systems engineering (C. Day)
- Breeding blanket case study (A. Spagnuolo)

10:30–11:00 – Coffee Break

11:00–12:30 – Materials and Engineering

- Thermo-hydraulics and thermo-dynamics of reactor components (P.A. Di Maio)
- Stellarator coil design optimization (D. Pereira)

12:30–14:00 – Lunch

14:00–15:30 – Techno-Economic and Engineering Readiness

- Validation and qualification of components (C. Day)
- Scaling, supply chain, grid integration (F. Ferrazza)

15:30–16:00 – Coffee Break

16:00–17:30 – Discussion Session

Closing the gaps on fusion technology R&D
(P. Batistoni with C. Day, F. Ferrazza, R. Villari, M. Wischmeier)

20:00–22:00 – School Banquet

Day 5 – Friday, 12 June

08:00–09:00 – Breakfast

09:00–10:30 – Safety, Regulation and Waste Considerations

- Safety and regulation (B. Colling)
- Environmental impacts, waste strategies (S. Diem)

10:30–11:00 – Coffee Break

11:00–12:30 – Roundtable

Preparing the next generation of fusion workforce
(D. Cruz with P. Batistoni, B. Colling, S. Diem, S. McIntosh)

12:30–14:00 – Lunch

14:00–15:00 Closing Lecture

- The ITER Project (S. McIntosh)

15:00–15:30 – Closing Remarks & Certificate Ceremony

16:00: Departures