

# Programme of the 17<sup>th</sup> Karlsruhe International School on Fusion Technologies 2025

KIT Campus North, Bldg. 401, Room 410

## Wednesday 07/05/2025

|                                        |                                                                                                  |             |                                                                                      |
|----------------------------------------|--------------------------------------------------------------------------------------------------|-------------|--------------------------------------------------------------------------------------|
| 8:45-9:00                              | Opening of the summer school                                                                     | T. Mitrovic |   |
| <b>Topic 1: Introduction to fusion</b> |                                                                                                  |             |                                                                                      |
| 9:00-10:00                             | DEMO and the road to fusion power (I))                                                           | S. Muldrew  |   |
| 10:00-10:15                            | coffee break                                                                                     |             |                                                                                      |
| 10:15-11:30                            | DEMO and the road to fusion power (II)                                                           | S. Muldrew  |   |
| 11:30-12:30                            | Practical Implementation of nuclear safety and licensing aspects within ITER and the TBM project | P. Wouters  |   |
| 13:30-15:00                            | Future energy and fusion power plants                                                            | J. Coenen   |   |
| 15:00-15:15                            | coffee break                                                                                     |             |                                                                                      |
| 15:15-16:45                            | Basics of magnetic confinement fusion and fusion technology                                      | J. Coenen   |  |

## Thursday 08/05/2025

|                                                    |                                                                     |              |                                                                                       |
|----------------------------------------------------|---------------------------------------------------------------------|--------------|---------------------------------------------------------------------------------------|
| <b>Topic 2: The fuel cycle of a fusion reactor</b> |                                                                     |              |                                                                                       |
| 8:30-9:45                                          | Tritium handling & tritium plant of a fusion reactor                | R. Gröble    |  |
| 9:45-10:00                                         | coffee break                                                        |              |                                                                                       |
| 10:00-11:45                                        | Fuel cycle                                                          | T. Giegerich |  |
| <b>Topic 3: Blankets</b>                           |                                                                     |              |                                                                                       |
| 13:00-14:30                                        | Basics of breeding blanket technology I                             | F. Hernandez |  |
| 14:30-14:45                                        | coffee break                                                        |              |                                                                                       |
| 14:45-15:45                                        | Solid breeder and Liquid metal breeder blankets (European concepts) | G. Zhou      |  |
| 15:45-17:00                                        | Magnetohydrodynamics of liquid metals                               | L. Bühler    |  |
| 19:00-22:30                                        | Dinner at Badisch Brauhaus                                          |              |                                                                                       |

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## Friday 09/05/2025

| Topic 3: Blankets                           |                                                                  |             |                                                                                     |
|---------------------------------------------|------------------------------------------------------------------|-------------|-------------------------------------------------------------------------------------|
| 9:00-10:45                                  | Tritium Processing in Breeding Blankets and Test Blanket Systems | I. Ricapito |  |
| 10:45-11:00                                 | coffee break                                                     |             |                                                                                     |
| 11:00-12:00                                 | Solid tritium breeder materials                                  | J. Leys     |  |
| 13:15-14:30                                 | Visit to HELOKA                                                  | B. Ghidersa |  |
| Topic 4: Neutronics and activation analysis |                                                                  |             |                                                                                     |
| 14:30-16:30                                 | Fusion neutronics – methods, data, applications                  | D. Leichtle |  |

## Monday 12/05/2025

| Topic 5: Plasma physics                                   |                                                   |             |                                                                                       |
|-----------------------------------------------------------|---------------------------------------------------|-------------|---------------------------------------------------------------------------------------|
| 09:00-10:30                                               | Introduction to plasma physics                    | N. Rivals   |    |
| 10:30-10:45                                               | Coffee break                                      |             |                                                                                       |
| Topic 6: Plasma heating technology and plasma diagnostics |                                                   |             |                                                                                       |
| 10:45-12:30                                               | Gyrotrons                                         | S. Illy     |  |
| 13:30-14:45                                               | Visit to Gyrotron Test Stand                      | S. Illy     |  |
| 14:45-16:00                                               | Introduction to neutral beam injection technology | A. Shepherd |  |
| 16:00-17:15                                               | Plasma diagnostics in fusion devices              | R. Sabot    |  |

## Tuesday 13/05/2025

| Topic 7: Technology of magnetic confinement  |                                                       |               |                                                                                       |
|----------------------------------------------|-------------------------------------------------------|---------------|---------------------------------------------------------------------------------------|
| 09:00-10:30                                  | Superconductivity and magnet technology               | K.-P. Weiss   |  |
| 10:30-10:45                                  | coffee break                                          |               |                                                                                       |
| 10:45-12:15                                  | High-Temperature Superconductivity                    | K.-P. Weiss   |  |
| Topic 8: Divertors                           |                                                       |               |                                                                                       |
| 13:15-14:45                                  | Manufacturing processes for High Heat Flux Components | P. Lorusso    |  |
| 14:45-15:00                                  | coffee break                                          |               |                                                                                       |
| Topic 9: Remote handling, maintenance scheme |                                                       |               |                                                                                       |
| 15:00-15:45                                  | Remote handling maintenance scheme I                  | M. Mittwollen |  |
| 15:45-16:45                                  | Remote handling maintenance scheme II                 | M. Mittwollen |  |

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**Wednesday 14/05/2025**

| <b>Topic 10: Materials development for fusion reactors</b> |                                                                                        |                |                                                                                     |
|------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------|
| 8:30-9:45                                                  | Basic Course on Irradiation Damage, Part I: Material Properties and Related Mechanisms | M. Rieth       |  |
| 9:45-10:00                                                 | coffee break                                                                           |                |                                                                                     |
| 10:00-11:30                                                | Part II: Effect of Neutron Irradiation on Solids                                       | M. Rieth       |  |
| <b>Topic 11: Safety, socioeconomics and waste</b>          |                                                                                        |                |                                                                                     |
| 11:30-12:45                                                | General safety analysis approach and techniques                                        | D. Dongiovanni |  |
| <b>Topic 12: Operating and planned facilities</b>          |                                                                                        |                |                                                                                     |
| 14:00-15:30                                                | Wendelstein 7-X                                                                        | H. Laqua       |  |
| 15:30-17:00                                                | ASDEX upgrade                                                                          | I. Zammuto     |  |

**Thursday 15/05/2025**

| <b>Visits to KIT Laboratories</b> |                                                             |                             |                                                                                       |
|-----------------------------------|-------------------------------------------------------------|-----------------------------|---------------------------------------------------------------------------------------|
| 8:30-12:15                        | Visit to Fusion Materials Laboratory/<br>Tritium Laboratory | H.-C. Schneider/<br>R.Größe |  |
| 12:15-12:30                       | Hand-out of certificates                                    | T. Mitrovic                 |  |