



ALAR
Training Center



ONLINE SUMMER SCHOOL

PLASMA PHYSICS AND CONTROLLED FUSION

Jul 05 - 16, 2021

**DO YOU WANT TO LEARN MORE ABOUT
CONTROLLED NUCLEAR FUSION? THEN THIS
COURSE IS FOR YOU!**

ECTS credits: 4.0



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BRIEF DESCRIPTION

This is a joint program developed in cooperation with School of Physical Sciences of SOKENDAI (the Graduate University for Advanced Studies, Japan). The course is suitable as the first plasma physics course or an add-on course for senior undergraduate students and graduate students. The primary objective of the course is to present the fundamentals of plasma physics particularly highlighting high-temperature plasma physics and its applications to controlled fusion. The course begins with an overview of plasma phenomena and their applications. The lectures cover Coulomb collisions, single particle motion in magnetic field, magnetic traps, principles of controlled fusion, plasma heating and diagnostics. The program also includes study visits to a tokamak laboratory and a laboratory for plasma technologies.

Cost:

2 weeks: US\$421

Participation fee includes tuition fee, study materials, visits to companies and cultural program, additional Russian Language virtual course by ALAR Training Center (33h) + Certificate

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Program dates:

Jul 05 - 16, 2021

Duration: 2 weeks

ECTS credits: 4.0

Registration deadline: 14 June 2021

Cultural program:

Online format:

- Online Pub Quiz
- Online Interactive Tour to SPbPU Museum
- Online broadcasting of excursion to the Hermitage museum



Entrance requirements:

- Knowledge of Calculus and General Physics corresponding to the first two years of a Bachelor's degree program in physics, mathematics, technology etc.
- Good command of English. All classes and extracurricular activities are conducted in English. Knowledge of the Russian language is not required.
- Applicants are expected to have at least 2 years of University level studies.



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Course description

- Plasma phenomena on Earth and in the Universe; historical overview of plasma physics; contemporary research areas and technological applications of plasmas; studies of controlled nuclear fusion.
- Definition of plasma; quasineutrality, Debye length, plasma frequency.
- Coulomb collisions, Rutherford's formula, Coulomb logarithm
- Motion of a single charged particle in magnetic field; Larmor radius, drifts, magnetic traps.
- Controlled nuclear fusion; Lawson criterion and ignition criterion.
- Principles of plasma heating with electromagnetic waves and neutral beam injection.
- Principles of plasma diagnostics, active and passive measurements, line-integral data.

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Professors and lecturers:

- P.R. Goncharov, Ph.D., Polytech, Russia
- N. Tamura, Ph.D., SOKENDAI, Japan.

Program partners:

- SOKENDAI: The Graduate University for Advanced Studies (Japan)
- A.F. Ioffe Physico-Technical Institute and Institute of Electrophysics and Electric Power of Russian Academy of Sciences

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