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INTRODUCTION TO NUCLEAR FUSION: PROCESS, PRESENT STATE OF THE ART

Saturday, 2 September 2023 12:10 (45 minutes)

Abstract: In this lecture, some principles of nuclear fusion and plasma physics will be presented. Special attention will be given to magnetic confinement fusion, which is nowadays the most developed method of confining hot thermonuclear plasmas. In addition, a brief overview of the state of the art on magnetic confinement fusion is provided. At the end, an overview about the newly growing fusion industry is provided, including a short description of the new methods for achieving fusion that have been proposed by different fusion companies.

To be noted: The school attendees will have the possibility to deepen their knowledge on this topic, thanks to the hands-on Lab prepared by Prof. Gustavo Paganini Canal et al. at the Tokamak Lab at the Physics Institute at USP (see INFIERI2023-Labs Booklet).

Lecturer: PhD in Plasma Physics from the École Polytechnique Fédérale de Lausanne, Switzerland, Postdoc at the General Atomics - Fusion Division, San Diego - USA, with a long term appointment at the Princeton Plasma Physics Laboratory, USA. Dr. Gustavo Paganini Canal is Associate Professor at the Institute of Physics of the University of São Paulo, Brazil, and coordinator of the upgrade of the Brazilian tokamak - the TCABR. This upgrade will allow for unique and advanced studies on the suppression of violent plasma instabilities, termed edge localized modes, which can represent a threat to the development of nuclear fusion power plants. This upgrade project is also providing technological advances within the Brazilian private sector. Prof. Canal is also the coordinator of the Plasma Physics area of the Brazilian Physical Society and the first author of the Brazilian National Program for Nuclear Fusion (Text informed by the Lecturer)

Co-author: Prof. PAGANINI CANAL, Gustavo (Institute of Physics, USP, BR)

Presenter: Prof. PAGANINI CANAL, Gustavo (Institute of Physics, USP, BR)

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