

2nd International Workshop on Proton-Boron Fusion



Monday, 5 September 2022 - Thursday, 8 September 2022

FOUR POINTS BY SHERATON CATANIA HOTEL

Workshop goal and topics

Main Objective

The “2nd International Workshop on Proton-Boron Fusion” is organised by INFN-LNS and ELI-beamlines.

The main objective of the “2nd International Workshop on Proton-Boron Fusion” is to develop further the scientific discussion started in the first edition (p-B fusion workshop organised at ELI-Beamlines in 2020) and to exchange new results and ideas among specialists from a broad international scientific community active in the field of proton-Boron fusion research.

Theory and simulation

The use of high power laser pulses to initiate proton-boron fusion reactions in a plasma can be optimized through a chain of advanced numerical codes that allows to describe most of the involved physical processes. On the other hand, the theory of proton-boron fusion in laser-generated plasmas is of key importance for the investigation and prediction of new approaches towards sustainable fusion for future applications.

Advanced fusion approaches

Despite the impressive increase of the pB fusion reaction yield demonstrated experimentally in the last decade, the possible use of such a reaction for net energy production still requires the investigation of innovative regimes. Innovative approaches, both theoretical and experimental, are required to further enhance the pB fusion reaction yield in plasmas.

Diagnostics and Targets

Several experiments recently conducted in laser-produced plasmas have revived the research investigation around pB fusion. The main products of such nuclear reaction (alpha-particles) have been systematically enhanced. The choice and optimization of the used target plays a key role for such fusion rate enhancement. In parallel, innovative diagnostic technics and methodologies have been developed and tested.

Applications

Intense α -particle streams generated in the pB fusion can be potentially used in multidisciplinary applications, such as production of radioisotopes of medical interest for PET or for radiotherapy. In addition, the possibility to use clinical proton beams to trigger pB reactions in the tumour with the goal to increase locally both LET and RBE, thus to enhance the protontherapy efficacy, was experimentally investigated.