Anno 2014

Istituto Nazionale di Fisica Nucleare >> Sua-Rd di Struttura: "Trento Institute for Fundamental Physics and Application (TIFPA)"

Parte III: Terza missione

QUADRO I.0	I.0 Obiettivi e linee strategiche relative alle attività di Terza Missione

The Trento Institute for Fundamental Physics and Applications (TIFPA) is a joint initiative of the National Institute of Nuclear Physics (INFN), University of Trento (UNITN), Bruno Kessler Foundation (FBK) and the Trento Province Healthcare Agency (APSS),aiming to establish a collaborative center for translational Physics research which includes state-of-the art development of related technologies. It is embedded in the fertile substrate offered by the Province of Trento research and technology context, and aims to capitalize on the collaborations already established across the past 20 years with the UNITN, and FBK. TIFPA means innovation (synergism among the four partners and collaborations with International partners such as CERN, NASA and ESA), scientific excellence (world-leading research), infrastructures (e.g. ECT* in Villa Tambosi, the FBK Center for Materials and Microsystems in Povo and the APSS protontherapy center) and translational research (high priority to applications and technological transfer).TIFPA participates in several experiments co-funded by INFN in particle physics (the ATLAS experiment at CERN, which discovered the Higgs boson), space research (e.g. AMS-02, LISA and VIRGO), nuclear physics (AEGIS experiment at CERN, on anti-hydrogen), theoretical physics (with a unique expertise in ab initio methods to solve the quantum mechanical many-body system) and applied physics (detectors and medical physics).For instance, the proton beam used at APSS for treating cancer patients is a tool to simulate space radiation on ground, and will be used to study shielding materials in spacecraft and cosmic radiation damage to microelectronics.

TIFPA is the research partner in the Trento protontherapy center a cutting edge cancer therapy center, unique in Italy, treating patients affected by different solid cancers in two rooms equipped with rotating gantries. A third room, with two horizontal beamlines, is totally dedicated to research. Pre-clinical research in proton radiobiology, in collaboration with the Centre for Integrative Biology (CIBIO) of UNITN, will allow a rapid translation of the research results from bench-to-bed. Innovative detectors for in vivo beam monitoring during the treatment, developed in collaboration with FBK and UNITN, will be tested in the research room for applications in the clinical environment.

TIFPA will benefit from the FBK expertise in silicon-based systems for detection of radiation, and their application in areas ranging from the analysis of biomedical materials to high-energy physics. New research and developments programs cover optimization of silicon photomultipliers for dark matter detection (DARKMATTER experiment), hybrid detectors for neutrons, graphene-based thermal detectors, sensor integration, rapid thermal processing, Cherenkov detectors, silicon carbide detector technologies, and pixel sensors for tracking applications. The center will enter the full production phase at the end of this year (2016).