Transfer of Knowledge

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Web site: risenews.df.unipi.it

European Commission

RISE – specific objectives Knowledge Transfer

- *"The RISE scheme will promote international and inter-sector collaboration through research and innovation staff exchanges, and sharing of knowledge and ideas from research to market (and vice-versa) for the advancement of science and development of innovation."*

- *"The scheme fosters a shared culture of research and innovation that welcomes and rewards creativity and entrepreneurship and helps to turn creative ideas into innovative products, services or processes."*

[2014-2015 Work Programme]

T10.1. Research-Industry Transfer of Knowledge

- NEWS Planned for significant Research-Industry Transfer of Knowledge through the direct involvement of non-Academic personnel in the research activities of the Academic partners.
  - Reporting of the ongoing activities during the periodic SB Meetings.
  - Coordination of the activities shared with the other WPs.

- Experienced researchers have been seconded for about 6 months FTE from Clever Operation to INFN and Pisa University:
  - March 2018 – March 2019
  - Ongoing secondments for more months in 2019

  Activities:
  - training, and collaborative research activities, on particle physics and astrophysics experiments.
  - devoted mostly to WP 10, but training and collaborative research activities were performed also on WP6, leveraging Clever's expertise in the field of radiation detection hardware and software and associated applications and markets.
  - Meetings and discussions with scientists and researchers from UNIPI, INFN Pisa/Frascati, FermiLab, as well as in side-by-side lab work.

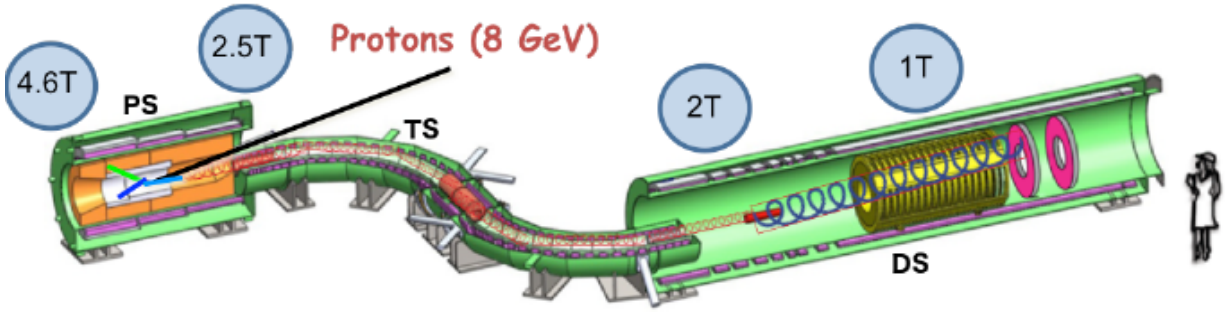
T10.2 - *GPD polarimeter for space applications*

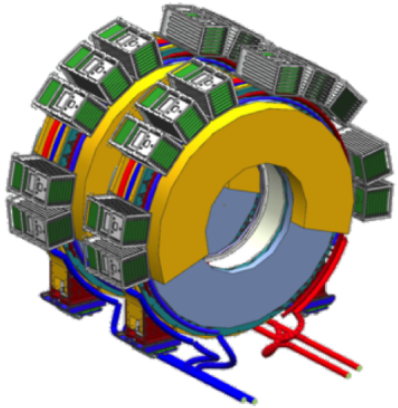
- Various introduction meetings and readings on IXPE mission and the detector part in particular.

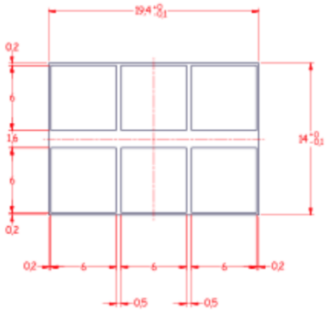
- Participation to the research activity with a focus on the FMECA (Failure Mode, Effects and Criticality Analysis).
  - The FMECA is performed to systematically identify potential failures in instrument, unit and sub-unit level and to assess their effects in order to define mitigation actions, starting with the highest-priority ones related to failures having the most severe consequences.
  - The failure modes identified are classified according to the severity of their consequences.

T10.3 - Electronics for particle physics and space applications - Introduction

Introduction to the Mu2e experiment and more specifically the crystal calorimeter and readout electronics





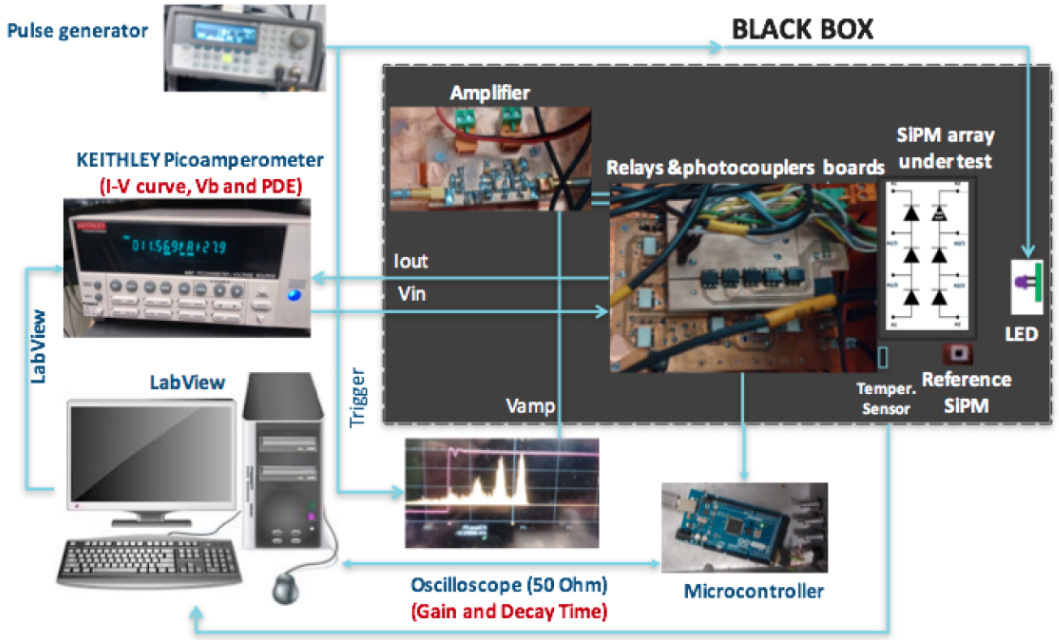


T10.3 - Electronics for particle physics and space applications - Contribution

To the design and development of the electromagnetic calorimeter, its readout electronics, and data acquisition system, and mainly the digitization system, which has challenging requirements in terms of performance and radiation tolerance.

T10.3 - Electronics for particle physics and space applications - Contribution

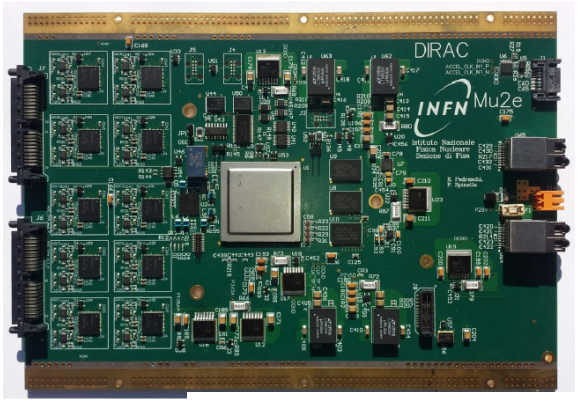
1. Development and optimization the DAQ of a semi-automatized test station used at FNAL in order to measure: gain, operational voltage, Idark and PDE of each cell of the photosensor and provide information about the homogeneity of the photosensor response.

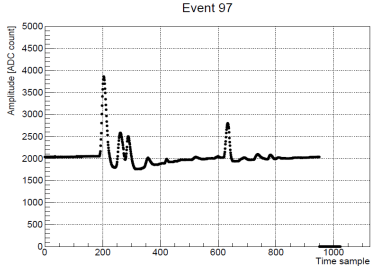


2. Preparation of the irradiation tests of the digitizing system performed at the HZDR irradiation facility in June 2018.

T10.3 - Electronics for particle physics and space applications - Contribution

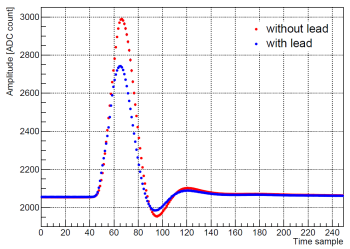
3. Development of the photosensors readout electronics, which has to be radiation hard :
   a. performance characterization and troubleshooting of the digitizing system prototype
   b. Testing one full readout channel consisting of one sensor module: formed of a scintillation crystal coupledto a photosensor array, front-end electronics, and the digitizing system.





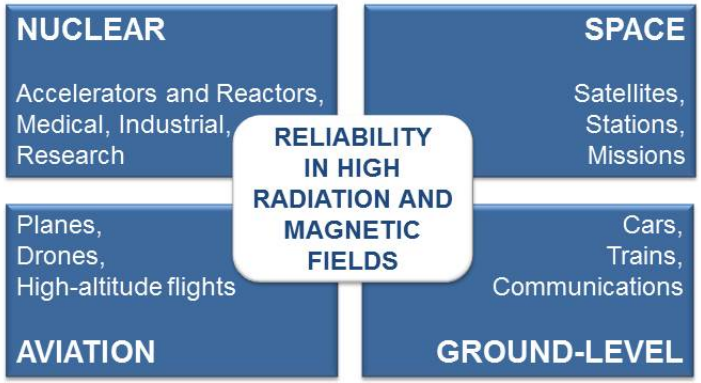
The system functioned successfully and this was a major step towards the implementation of a full-scale 20-channel system.

Please refer to the following by ELENA.



T10.3 - Electronics for particle physics and space applications - Contribution

4. CLEVER also performed a preliminary study of the innovation potential and impact of the digitizing system designed by INFN researchers from different perspective: societal, scientific and technological potential, as well as preliminary market analysis.



5. The collaboration between INFN, UNIPI and CLEVER yielded the following R&D and Innovation efforts to be submitted
   - The proposal "INTENSE" (H2020-MSCA-RISE-2018) which has been invited to grant preparation (GA 822185, started January 2019).
   - proposals to the ATTRACT Call in 2018.
   - More ongoing efforts…

T10.6 – Training courses

- The first NEWS General Meeting has been organized at INFN-Pisa and UNIPI in conjunction with the Fermi-LAT Collaboration Meeting (March 2018).
  - Training session during the Fermi-LAT Open Day.
  - Update on the most important experiments and related activities, whose outcome are involved with Fermi science.

- Training course on gravitational waves during the Majorana Lectures, organized by the Physics Dept. of the Naples University and the INFN – Naples Section.

- Training course organization for the next General Meeting in 2019.

Outlook

- Clever planned, and is executing, several months of secondments in 2019 (Simone's Talk)

- Clever is looking into hiring a new researcher to be seconded for longer periods at INFN Pisa.

Acknowledgement

- Thanks to the European Commission – the programme officer
- Special thanks to:
  - The Programme Coordinator Simone Donati,
  - Franco Spinella, Elena Pedreschi and Luca Morescalchi,
  - Carmello Sgro, Luca Baldini, and Luca Lantronico,
  - All others for the support and warm welcome.

BACKUP SLIDES

NEWS-WP10: Knowledge Transfer – Objectives

- O10.1: Coordinate all the activities dedicated to the training of personnel, to
  - achieve the maximum transfer of knowledge among project participants and
  - increase the quality of the research and the competitiveness of participant Institutions.

- O10.2: Provide trained personnel with enough capabilities to be independent in the acquired skills.

T10.1 - objectives

- "T10.1: Research-Industry Transfer of Knowledge (ALL): Maximization of the Transfer of Knowledge among
  - research institutions,
  - international Laboratories, and
  - companies

  which will be placed in contact with the most recent developments in science and acquire new competences. "

T10.2 – objectives

- *"T10.2: GPD polarimeter for space applications (INFN, UNIPI, Prisma, Clever):*

  INFN will transfer its long-standing expertise in integration and production of X-ray detectors for space applications. The GPD prototypes will be thoroughly tested and characterized at INFN and the final design implementation and will serve as a base for the definition of the assembly procedure of all flight models."

T10.3 – Objectives

- *"T10.3: Radiation hard electronics components for particle physics and space applications (INFN, UNIPI, HZDR, OIA, Prisma, Clever):*

  INFN, UNIPI and OIA will transfer their expertise in the design of radiation hard electronics components for particle physics and space applications to Prisma and Clever. This will be important for future involvement of these companies in projects for the development of components for space or medical applications for invivo dosimetry at proton and ion beams. HZDR will provide training on the use of irradiation facilities."

T10.4 and T10.5 - Objectives

- T10.4: State-of-the-art electrochemical techniques (POLIMI, FNAL, FRD): Transfer of knowledge between POLIMI, FNAL and FRD to optimize electrochemical techniques for Nb3Sn thin layer deposition on Nb and Cu surfaces to develop superconducting wires and radio-frequency cavities.

- T10.5: High-Speed Computing (ALL): Transfer of the US Laboratories Scientific Computing Divisions competencies in the field of high-speed computing, grid, cloud computing, to European research Institutions involved in the development of computing infrastructures and data analysis.

T10.4 and T10.5 - Reporting

- T10.4 (Electrochemical techniques):
  - No action performed yet.

- T10.5 (High speed computing):
  - No action performed yet.

T10.6 – Objectives

- T10.6: Training courses (ALL):

  Organization of special training courses in connection with the General Meetings. Training Sessions will be devoted to trainings on specific advanced topics from research development in fundamental physics or from technological developments from companies.

WP10 - Deliverables

D10.1 in M9 – Report on Trainings – Lead : UNINA

In coincidence with the General Meetings trainings will be organized to spread the acquired knowledge by the experts of each area among all the project participants.

D10.1 : Trainings [9] In coincidence with the General Meetings, trainings for the project researchers will be organized. There will be trainings delivered both by external experts and by the project researchers. These will take place on M9, M21, M33, M45.