Software Upgrades of Beam and Irradiation Test Infrastructures in AIDA-2020

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Advanced European Infrastructures for Detectors at Accelerators (AIDA-2020) is an EU-funded project that unites important European research infrastructures in the field of detector development and testing.
What is AIDA-2020?

- 24 countries and CERN (the European Organization for Particle Physics);
- Coordinated program, in line with the priorities of the European Strategy for Particle Physics (URL: https://europeanstrategy.cern/european-strategy-for-particle-physics):
  - Networking Activities (NAs);
  - Transnational Access (TAs);
  - Joint Research Activities (JRAs).
- 15 different Work Packages (WPs);
- On track newsletter:
  
  URL: http://aida2020.web.cern.ch/content/newsletter
AIDA-2020 is divided into 15 Work Packages. A Work Package (WP) is a unit of work within the project. The WPs are theoretically independent, but they were defined in order to foster synergies in AIDA-2020:

- **Management and Coordination**
  - WP1 (MGT): Project management and coordination

- **Networking Activities**
  - WP2 (NA1): Innovation and Outreach
  - WP3 (NA2): Advanced Software
  - WP4 (NA3): Micro-electronics and interconnections
  - WP5 (NA4): Data acquisition system for beam tests
  - WP6 (NA5): Novel high voltage and resistive CMOS sensors
  - WP7 (NA6): Advanced hybrid pixel detectors
  - WP8 (NA7): Large scale cryogenic liquid detectors
  - WP9 (NA8): New support structures and micro-channel cooling

- **Transnational Access**
  - WP10 (TA1): Beam test facilities
  - WP11 (TA2): Irradiation test facilities
  - WP12 (TA3): Detector characterisation facilities

- **Joint Research Activities**
  - WP13 (JRA1): Innovative gas detectors
  - WP14 (JRA2): Infrastructure for advanced calorimeters
  - WP15 (JRA3): Upgrade of beam and irradiation test infrastructure
WP15 Activities

- **Beam and irradiation test facilities**: Infrastructures for the qualification of particle detectors, material, and components prior to their installation in High-Energy Physics (HEP) experiments such as those performed at CERN.

- WP15 is involved in the improvement of the beam and irradiation test facilities infrastructures.

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CERN Proton Irradiation Facility

CERN Gamma Irradiation Facility

JSI neutron irradiation facility

(Image: Branko Čeak, National Geographic, Slovenia)

Birmingham Proton Irradiation Facility

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B. Gkotse at Project Networking Session in ESWC2019
• **Database of irradiation and test beam facilities**: Open online databases containing information about irradiation and test beam facilities;

• URL: [http://cern.ch/irradiation-facilities](http://cern.ch/irradiation-facilities);

• 211 entries;

• Data:
  - Facility coordinator
  - Institute
  - Facility information
  - Safety
  - Accessibility
  - Additional comments

• Test beam facilities database under development
Software Development Activities in WP15

- Proton beam of $24 \text{ GeV/c}$
- Testing inner detector components of the HEP experiments
81 experiments completed in 2018:

- **92 users**
- **792 objects** tested in 2018

Experiments distribution

- CERN groups / A&T sector: 21%
- LHC experiments: 47%
- R&D projects / RADMON: 28%
- HI: 4%
IRRAD Data Manager (IDM): A data management web application used in the Proton Irradiation Facility at CERN (IRRAD):

- Experiments, samples, users and dosimeters registration
- Real-time follow-up of irradiation experiments
- Computation of proton interaction parameters
- Display and archive of dosimetry result
- User Interface preferences customization
- History and details of past experiments (with user permission)

URL: https://cern.ch/irrad-data-manager

Status of irradiation experiments

Inserting information for the material composition of items to be irradiated
Irradiation Experiments Data Management ontology (IEDM): IEDM includes concepts of data management of irradiation experiments extending classes from the Ontology of Scientific Experiments (EXPO), the Units of Measure ontology (OM) and the Friend-of-a-Friend ontology (FOAF).

Ontology representation with Protégé
https://gitlab.cern.ch/bgkotse/iedm

Online documentation with Widoco
http://cern.ch/iedm

*B. Gkotse, P. Jouvelot and F Ravotti, “IEDM: An Ontology for Irradiation Experiments Data Management”. Accepted at the ESWC2019 Posters and Demos session
AIDA-2020 URL: http://cern.ch/aida2020

AIDA-2020 contact form: http://aida2020.web.cern.ch/contact

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