PROPOSAL for a Thesis on Instrumentation @ LNF-INFN

"Design, Construction and Test of an innovative Micro Pattern Gaseous Detector (MPGD) based on the micro-RWELL technology"

The **micro-RWELL** detector technology developed **since the 2014 at INFN-LNF** shows several advantages with respect **the standard MPGD technologies such as GEM and MicroMegas:** the detector is **thin, simple and robust against radiation**. All these features make the **micro-RWELL a valuable solution for large area fine tracking and sampling calorimetric devices**, where high reliability, construction simplicity and cost-effective technology are required.

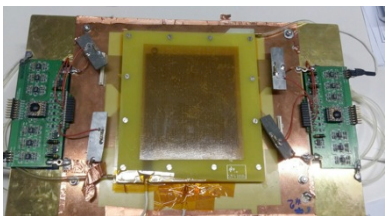
The detector **technology is mature for the industrialization of the various manufacturing steps**. The Technology Transfer process has already been started with Italian and European Companies leader in the photolithography technique.

The detector is of extreme interest for possible uses **as muon device** in the **future upgrade at the LHC experiments (LHCb)** as well as in **the future electron and hadron colliders** around the world **(FCC-ee, FCC-hh, CEPC)** as a **device for muon system with improved performance** with respect present gaseous detector technology.
The technology is suitable also for **X-ray and neutron imaging in industrial applications, and in particular for homeland security,** where muon tomography requires for very large area coverage.

During the thesis **several detector prototypes will be built, instrumented** with custom front-end electronics and **characterized with the X-rays Test Facility** of the **LNF-DDG laboratory,** while the measurement of the tracking and timing performance will be performed at **the H8-SPS beam area at CERN – Meyrin (Geneva)** and **πM1-beam area of the PSI – Willigen (Zurich).**

The activities could be focused on the following items:

I. **detector simulation**
II. **detector design**
III. **optimization and industrialization of the production processes**
IV. **prototype characterization**
V. **integration of front-end electronics**
VI. **development of reconstruction algorithms**
VII. **production and test with beam of prototypes to prove scalability of technology**



10x10 cm² µ-RWELL prototype

Contact Persons:
- **Dr. G. Bencivenni 06-94038051**
giovanni.bencivenni@lnf.infn.it
- **Dr. M. Poli Lener 06-94038179**
marco.polilener@lnf.infn.it

1x0.5 m² µ-RWELL prototype