

RIVELATORI PER  
LA FISICA DEL  
FUTURO



infn

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# MARIANGELA BONDI' IN BRIEF

## ★ INFN - LNS

- Master degree in Physics: study of  $2n$  transfer reaction mechanism
- PHD: study of double charge exchange reaction mechanism

## ★ INFN - CT

- PostDoc: Light Dark Matter searches @ JLAB

## ★ INFN - GE

- PostDoc: Streaming Readout for future electron scattering experiments

## ★ INFN - ROMA2 & UNI-TOR VERGATA

- RTDA: MPGD R&D for:
  - Fusion reaction diagnostic
  - CLAS12 upgrade

# THE $\mu$ RWELL

The device is composed of 2 elements:

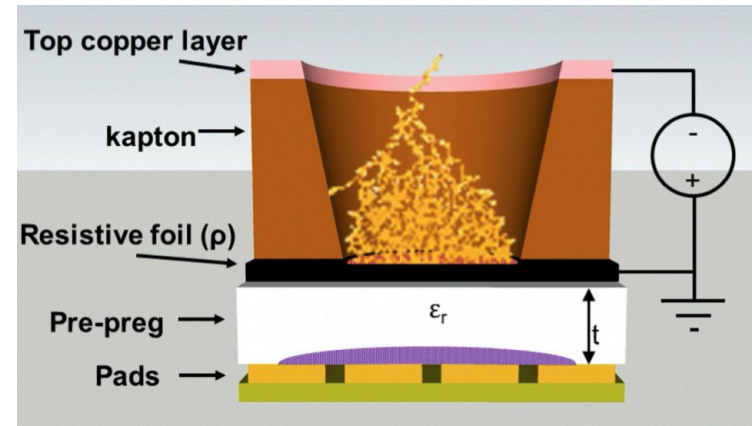
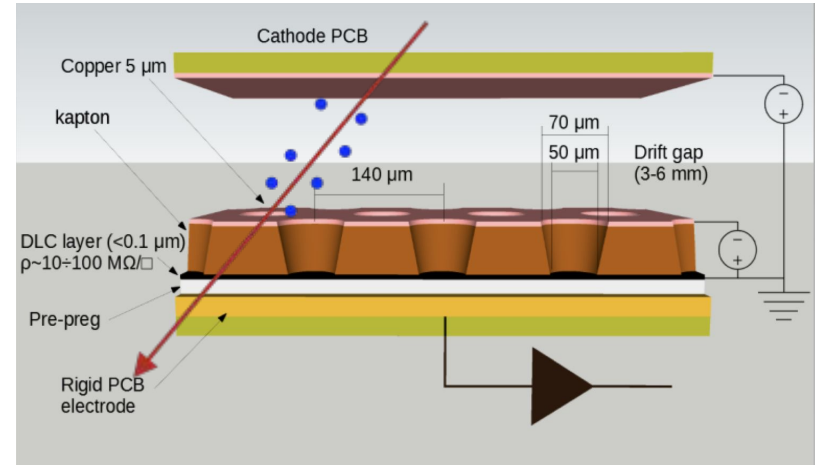
- ★ drift/cathode PCB defining the gas gap
  - i.e thermal neutron imaging using  $^{10}\text{B}$  coated cathode as neutron converter
- ★ amplification stage + DLC film + Readout PCB
  - The "well" acts as a multiplication channel for the ionization produced in the gas of the drift gap

★  $\mu$ RWELL features:

- Compactness
- Easy assembly
- Intrinsic spark quenching

★  $\mu$ RWELL performances:

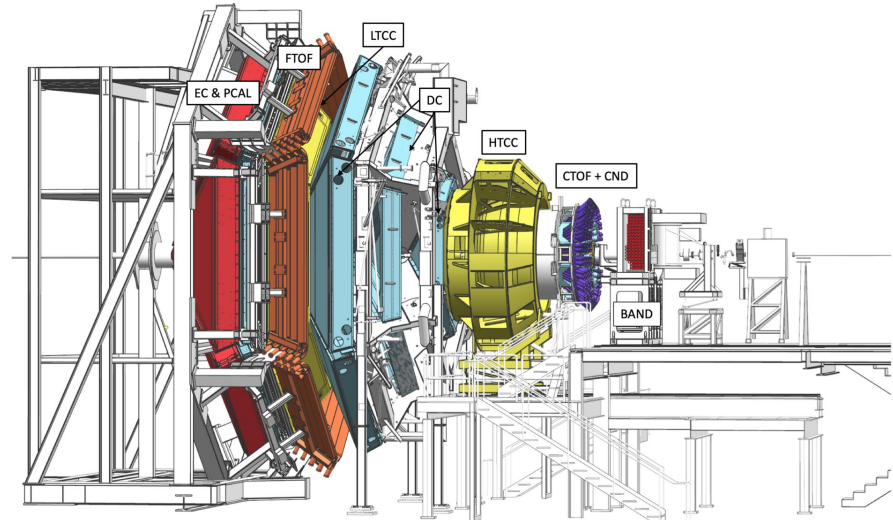
- Gain:  $10^4$
- Rate capability up to 10 MHz/s
- Spatial resolution  $\sim 60\mu\text{m}$
- Fast response



# CLAS12 UPGRADE

- ★ World-leading QCD facility installed at JLAB-HALLB
- ★ Expansive experimental program:
  - investigation of nucleon structure
  - searches for exotic meson and baryon configuration
  - ...
- ★ Improving the luminosity (at least of a factor 2 :  $2 \times 10^{35} \text{cm}^{-2} \text{s}^{-1}$ ) will significantly enhance the physics reach of experiments in Hall B
  - **Limitation: Drift chambers timing response**
- ★ Add fast tracking layer(s):
  - Large area  $O(1\text{m})$  and low material budget
  - High performance and low channel count readout
- ★  **$\mu\text{RWELL}$  is the best solution but R&D activity is necessary**
  - Simulation
  - Prototypes construction and test

★ R&D for CLAS12 is useful for future e- scattering experiment (e.g. EIC)



# FUSION ENERGY

★ It has the potential to provide a safe, cost-efficient and suitable solution to global energy needs

- No difficult waste issues
- Climate friendly
- Fusion fuels are widely available and nearly inexhaustible
  - Deuterium distilled from water
  - Tritium can be produced (e.g.  $n+6\text{Li}\rightarrow 4\text{He}+\text{T}$ )
  - Polarized fuels: up to 50% enhancement in cross section
- Several projects: ITER, DEMO, DTT

★ Tokamak magnetic confinement

★ Inertial confinement

★ Plasma diagnostic: Neutron measurements, X-Ray..

- Fast time response, compact dimension, high counting rate capability, radiation resistance : [uRWELL](#) satisfies the requirements

