GASEOUS DETECTORS R&D

LIP COIMBRA | DEPARTMENT OF PHYSICS | 4th FLOOR | ROOMS G.17 & G.18

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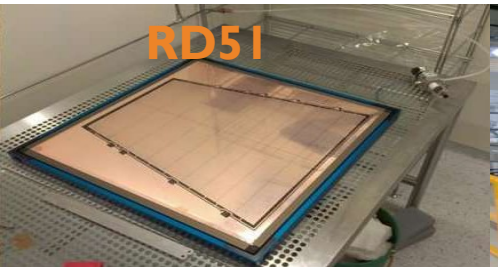
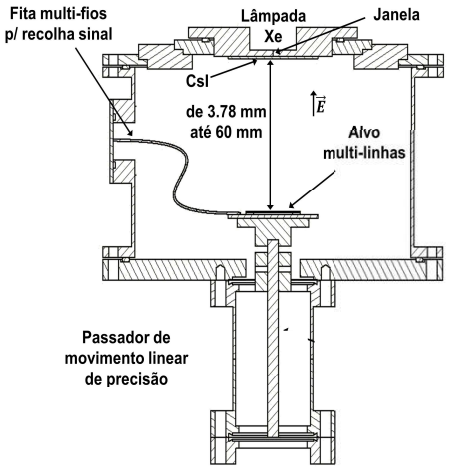
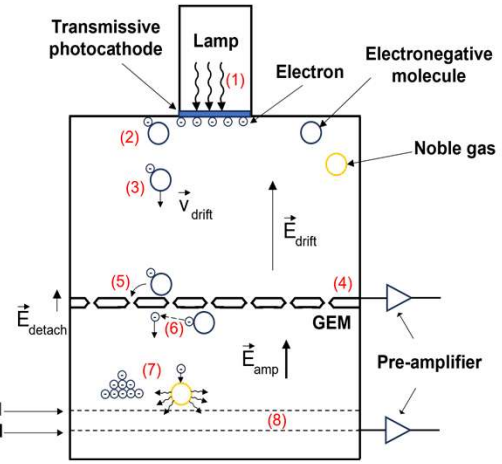
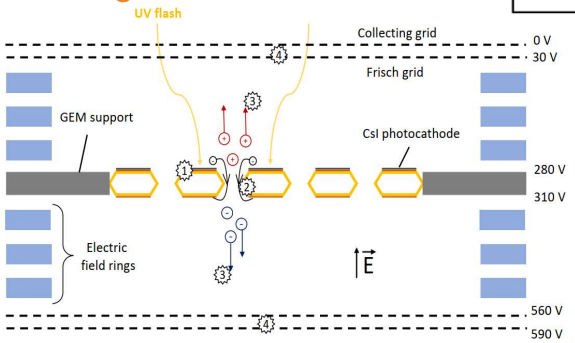




Electron Diffusion Measurement Chamber



Negative ions as charge carriers



Dual Polarity Ion Drift Chamber (DP-IDC)

GASEOUS DETECTORS R&D

- **Design and planning of gas detectors**;
- **Study of gas mixtures:** optimize electron diffusion, stopping power, energy resolution – without compromizing other important properties of the mixtures; New interest in exploring ecofriendly gases (CERN-DRD1)
- **Study of electron drift of electrons and ions** (positive and negative) in gases;
- **Custom Monte Carlo simulation** to explain experimental results (now on hold);
- Deeper understanding on the formation and properties of **negative ions**;

Ongoing work:

- **Negative Ions as Charge Carriers in Gaseous Detectors**;
- **New detector fully working. Data to be analysed**
- **Complementary studies on negative ions;**
- **Dual Polarity Ion Drift Chamber (DP-IDC);**
- **Electron Diffusion Measurements**;
- **Characterization of the IR emission spectra from noble gases**

International collaborations:

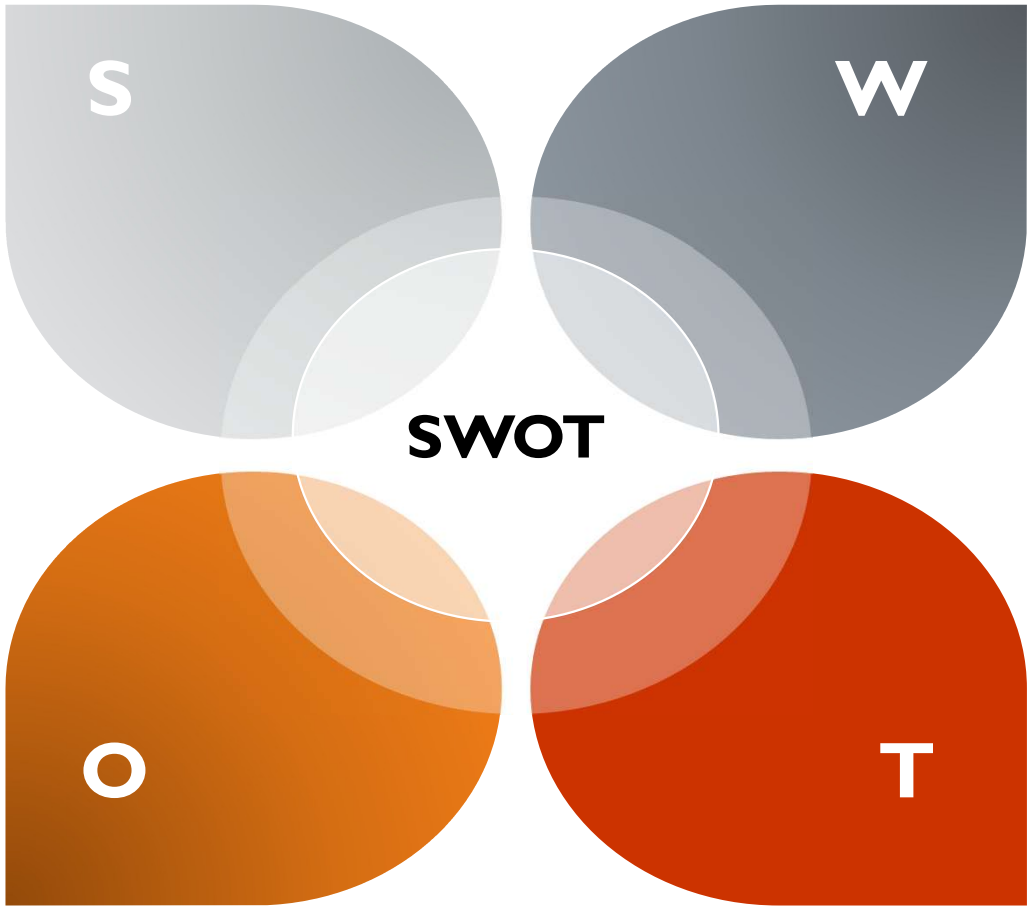
- **NEXT** (Neutrino Experiment with a Xe TPC);
- **RD51 – DRD1** (CERN Collaboration);
- **Astrocent/CAMK PAN (Poland)**

STRENGTHS

- Students doing thesis, curricular internships and summer internships. In the past 3 to 4 years:
  - 12 students in summer internships and 4 students in curricular internships
  - 1 PhD student + 1 finished PhD
- Theoretical, simulational and experimental experience/know-how
- Strong presence in the NEXT Collaboration
- Good involvement with young researchers

OPPORTUNITIES

- Successful student internships leading to MSc and PhD projects
- Negative ions as charge carriers in noble gases may provide necessary information accuracy on rare-event experiments
- New perspectives within Next Collaboration with negative ions



WEAKNESSES

- Lack of/very limited and non-stable internal and external funding leading to less projects, grant holders, laboratory material and, ultimately, results
- Reduced number of early career researchers

THREATS

- Irregularity in funding projects (FCT, mainly)
- Difficulty in having stable team due to lack of financing