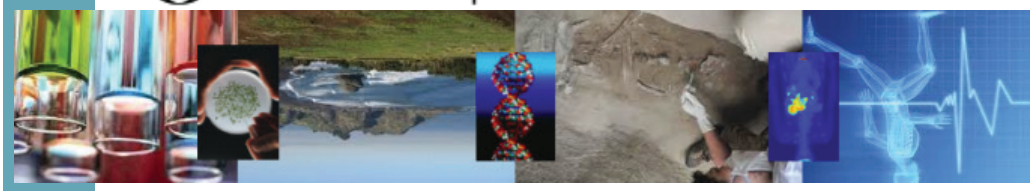
LSBB
Laboratoire Souterrain à Bas Bruit
Low Noise Inter-Disciplinary Underground Science & Technology

LISBOA | UNIVERSIDADE DE LISBOA



CENTRO DE CIÊNCIAS E TECNOLOGIAS NUCLEARES (C2TN)

IDENTITY

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WEBSITE
https://sites.google.com/site/dm2011simple
http://c2tn.tecnico.ulisboa.pt/en/gruposde-investigacao/engenharia-e-tecnicasnucleares/

RESEARCH THEMES

- direct search for astroparticle dark matter.
- R&D of superheated liquid techniques.
- R&D of new acoustic instrumentations.
- low radioactive background materials for detector-experiment constructions.
- theoretical interpretations of experimental search results.

KEY WORDS

Direct dark matter search / Superheated liquids & detectors /Low radiobackground /underground environment

PRESENTATION

Centro de Ciências e Tecnologias Nucleares (C2TN) is a research unit of Instituto Superior Técnico (IST), which gathers together with Technological Development Laboratories (LDTs), the main human resources, skills and research infrastructure of the former Instituto Tecnológico e Nuclear (ITN). C2TN is located on the premises of Campus Tecnológico e Nuclear (CTN), IST Pole of Loures.

This Research Center in Nuclear Sciences and Technologies is a crosscutting structure with proven expertise in Nuclear Physics & Engineering, Radiological Protection and Nuclear Safety, Radiopharmaceutical Sciences, Chemistry & Radiochemistry of d- and f- Elements, Materials Science, Nuclear and Related Techniques for characterization of Materials, Environment & Cultural Heritage.

SKILLS AND KNOW-HOW

The Nuclear Engineering and Techniques (NET) group has a strong expertise in nuclear physics and engineering and nuclear analytical techniques (NAT). Nuclear techniques and engineering methods acquired in the Portuguese Research Reactor (RPI) are used to solve a wide range of fundamental and applied problems, from the search for dark matter to dynamical structural analysis in components of nuclear power plants.

LSBB PROJECT

SIMPLE is an international collaboration which searches for direct evidence of astroparticle dark matter (WIMP) using superheated liquids. Located in GESA at 505 m depth, its recently-completed Phase II preliminary search measurements comprised two arrays (15 detectors each) of droplet detectors, and yielded constraints on both spin-dependent and –independent WIMP interactions. The result in the spin-independent sector, together with XENON, CDMS, LUX) denied areas of the phase space identified by several projects (CoGeNT, DAMA/LIBRA, CRESST) as containing a possible WIMP discovery, while providing in the spin-dependent sector the most restrictive limit against a WIMP-proton coupling. Its in-progress Phase III involves a transfer to bubble chambers, and their prototype testing, prior the Phase IV construction of a 20x 50L chamber array. The detectors are R&D'd at C2TN(P), underground tested & operated in the LSBB.

SPECIAL EQUIPMENT

Detector Fabrications:
(LSBB « Salle Blanche »)
- 80L hyperbaric chamber
- materials & equipment for fabrications of both droplet & bubble chamberdetectors, including glassware, bidistiller, liquids.
- weak Am/Be neutron calibration source.
- material & equipment for acoustic instrumentation construction

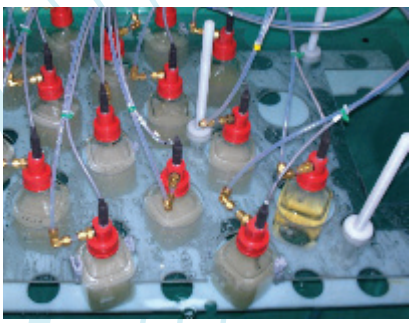
Measurements:
(LSBB GESA)
- 2x Huber polycryostats
- 700L temperature-regulated waterbath
- 8 ton water in 20L boxes.
- acoustic DAQ system, comprising 16x microphones-preamps and 3 TB pcs.
-2x local radon monitors

WEBSITE LSBB LINK

http://www.lsbb.eu/index.php/fr/ct-menu-item-19/ct-menu-item-82/ct-menu-item-94

PARTNERSHIPS PROMOTION

- Dep't. Física/ULisboa, Portugal
- C2TN/Instituto Superior Tecnico, Portugal
- Dep't. Physics, Instituto Superior Tecnico, Portugal
- Dep't. Telecommunications, Instituto Superior Tecnico, Portugal
- ICMN, University of Orleans, France
- CRIOLAB, Lda (Portugal)



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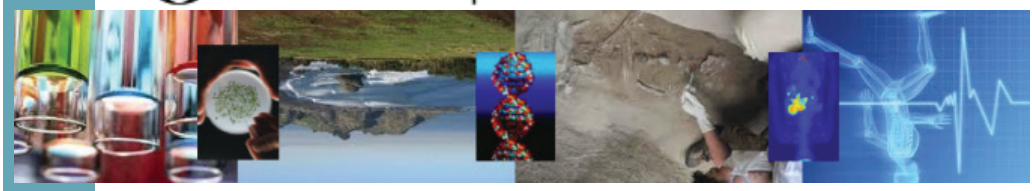

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PRESENTATION

EQUIPEMENT SPECIAL

COMPÉTENCES ET SAVOIR-FAIRE

LIEN SUR LE SITE DU LSBB

http://www.lsbb.eu/index.php/fr/ct-menu-item-19/ct-menu-item-82/ct-menu-item-94

THÈMES DE RECHERCHE

PARTENARIATS ACADÉMIQUES

- Dep't. Física/ULisboa, Portugal
- C2TN/Instituto Superior Tecnico, Portugal
- Dep't. Physics, Instituto Superior Tecnico, Portugal
- Dep't. Telecommunications, Instituto Superior Tecnico, Portugal
- Dep't. Physics, University of Durham, UK
- Inst. Computational Sciences, University of Zurich, Switzerland
- ICMN, University of Orleans, France
- Dep't. Theoretical Physics, University of Zaragoza, Spain
- CRIOLAB, Lda (Portugal)

PROJET LSBB

MOTS CLÉS

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