



IrFU

Institut de recherche
sur les lois fondamentales
de l'Univers

**Séminaire
SPP**

Lundi 13/10/2014, 11h00

CEA-Saclay Bat 141, salle André Berthelot

Searches for Dark Matter production at colliders

O. BUCHMUELLER

Imperial College, London, UK

The standard model (SM) of elementary particles and their interactions has provided a remarkably accurate description of all experiments in particle physics. This has established our understanding of the physics of the very small up to energy scales of around 100 GeV. The Large Hadron Collider (LHC) at CERN was conceived to probe the physics of the next frontier, that of the TeV energy scale, and to provide a definitive statement on whether or not the Higgs boson exists.

The most popular and by far best understood extension of the SM is the framework of supersymmetry (SUSY), a symmetry that relates each elementary particle to a super-partner whose spin differs by 1/2. Like in the SM, SUSY is built around a Higgs sector but provides possible solutions to several theoretical problems of the SM e.g. the hierarchy problem. It is also a prime candidate to explain the amount of dark matter observed in our Universe. With the recent discovery of a Higgs boson at a mass around 126 GeV and in the absence of any sign of New Physics signatures so far, even more focus has been placed on the interpretation of key collider searches in order to establish a more comprehensive understanding of the "big picture".

One important class of these topology searches are the so-called missing energy searches, which can be used to probe dark matter production in proton-proton collisions at the LHC. The interpretation approach of these searches varies from dedicated characterisation in New Physics models like SUSY to less model-dependent strategies.

In this seminar I will present an overview of the missing energy searches at colliders ranging from generic topology searches probing SUSY cascade production over generic dark matter searches like the mono-X analyses. I will also comment on the comparison of these collider-based searches with direct dark matter detection experiments with a special emphasis on establishing the complementarity of the two approaches.

Le café sera servi 10 minutes avant.

NB : La présentation d'une pièce d'identité est exigée à l'entrée du centre. Tous les auditeurs extérieurs sont priés de prévenir à l'avance Martine Oger, tél. 01 69 08 23 50, e-mail : martine.oger@cea.fr. (U.E. : délai de 24 h, hors U.E. : délai de 4 jours).