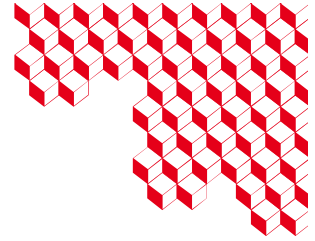




Institut de Recherche sur les lois  
Fondamentales de l'Univers



Département de Physique Nucléaire

Séminaire ESNT-DPhN

Mardi 30 janvier 2024 11-12h

Bât 703, room 135 DPhN CEA Saclay, Orme des Merisiers

**Valerio Belocchi**

University of Turin and INFN, Turin

**Inclusive and semi inclusive lepton nucleus scattering  
in quasielastic region and beyond**

High-precision measurements in neutrino oscillation experiments require a very accurate description of the lepton-nucleus scattering process. Several cross-section calculations are available, but important discrepancies are still present between different model predictions.

For the quasi-elastic channel, dominated by one particle-one hole excitations, an overview over several nuclear models - specifically Relativistic Fermi Gas, Super Scaling Approach, Spectral Function, Hartree-Fock and Random Phase Approximation - is presented and compared with data for electron-nucleus scattering, a very important process for testing theoretical models validity, highlighting the specific features of each approach.

Furthermore an ongoing microscopic calculation of the two particle-two hole excitations contribution to the electromagnetic response is presented, starting from the theory behind the meson exchange current definition. In the Relativistic Fermi Gas framework, the electron-nucleus cross sections are computed, for inclusive -only the outgoing lepton is detected- and semi-inclusive -the outgoing proton is detected too- processes, illustrating some details of the semi-inclusive computation. Some new results are shown.

*This seminar is organized in the framework of the ESNT project:*

**Meson Exchange Current contributions in semi inclusive lepton nucleus scattering**

*held at CEA Saclay Orme les Merisiers site, 29<sup>th</sup> January-2<sup>nd</sup> February 2024.*

*<https://esnt.cea.fr/Phoce/Page/index.php?id=117>*

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