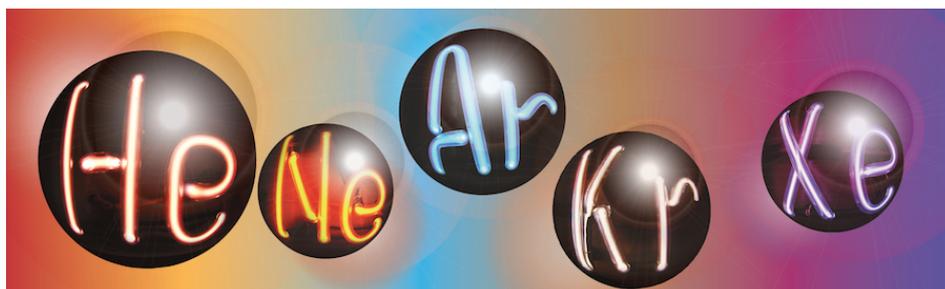


# LIDINE 2024: Light Detection In Noble Elements

Monday 26 August 2024 - Wednesday 28 August 2024



## Book of Abstracts

**Author:** Pedro Zilves Maio Ventura<sup>1</sup>

<sup>1</sup> *São Paulo University*

**Corresponding Author:** pzventura@usp.br

In the context of the search for dark matter scattering signals with the nucleus, experiments using liquefied noble gases, such as argon (LAr) and xenon (LXe), play a significant role. The direct detection of dark matter particles with masses above 1 GeV/c<sup>2</sup> has already been extensively explored. Attention now turns to the low-mass region. An attractive opportunity in this region is the observation of signals from a possible interaction of light dark matter with electrons in the target material. Due to the high detection efficiency of S2 electroluminescence signals, even at low energies, scattering between light dark matter and electrons becomes a channel of great interest.

In this work, I present a study on the ionization form factor of argon and xenon atoms, essential for calculating the expected DM-electron scattering event rate in current detectors, along with the kinematic limitations imposed by the standard galactic dark matter halo model.

### Poster Session / 34

## Comparing the performance of CuO dispersive media for O<sub>2</sub> capturing in Liquid Argon

**Authors:** A. M. Caffer<sup>1</sup>; R. G. Gonçalves<sup>2</sup>; H. B. Pizzi<sup>3</sup>; D. S. Passos<sup>3</sup>; G. S. Freitas<sup>3</sup>; C. Reis<sup>4</sup>; I. O. Mazali<sup>5</sup>; D. Cardoso<sup>2</sup>; E. Assaf<sup>6</sup>; R. Soccol<sup>7</sup>; P. Bianchi<sup>7</sup>; G. Wiederhecker<sup>3</sup>; D. Noriler<sup>7</sup>; C. R. A. dos Santos<sup>3</sup>; M. Fontes<sup>8</sup>; D. Correia<sup>8</sup>; H. Frandini<sup>3</sup>; F. Demolin<sup>3</sup>; A. Augusto<sup>9</sup>; R. Doubnik<sup>10</sup>; M. Adamowski<sup>10</sup>; D. Montanari<sup>10</sup>; T. P. M. Alegre<sup>3</sup>; A. A. Machado<sup>3</sup>; E. Segreto<sup>3</sup>; C. Adriano<sup>3</sup>; J. M. Assaf<sup>2</sup>; P. G. Pagliuso<sup>3</sup>

<sup>1</sup> UNICAMP

<sup>2</sup> *Advanced Materials and Energy Research Center, UFSCAR, São Carlos, Brazil*

<sup>3</sup> *“Gleb Wataghin”, Institute of Physics, UNICAMP, Campinas, Brazil*

<sup>4</sup> *University of São João del Rei, São João del Rei, Brazil*

<sup>5</sup> *Institute of Chemistry - UNICAMP, Campinas, Brazil*

<sup>6</sup> *Institute of Chemistry of São Carlos at USP, São Carlos, Brazil*

<sup>7</sup> *School of Chemical Engineering, UNICAMP, Campinas, Brazil*

<sup>8</sup> *Brazilian Center for Research in Physics, Rio de Janeiro, Brazil*

<sup>9</sup> *Equatorial sistemas S.A., Grupo Akaer, São José dos Campos, Brazil*

<sup>10</sup> *Fermi National Accelerator Laboratory, Batavia, Illinois, USA*

**Corresponding Author:** anamariacaffer@gmail.com

In this work, we have explored the potential of oxygen capture in Liquid Argon (LAr) of the innovative CuO dispersive layered double hydroxide media (R-LDH) and the Ce-doped R-LDH. Low-temperature experiments in the LAr Purification Cryostat (PuLArC) at IFGW/Unicamp were performed using LAr circulation through two filters, one containing the R-LDH (or the Ce-doped R-LDH) material and the other the BASF commercial copper material (Cu-02265 - proposed as a reference O<sub>2</sub> getter media by Fermilab) for comparison. Interestingly, the experiments performed in PuLArC revealed that the R-LDH and Ce-doped R-LDH innovative medias were capable of capturing O<sub>2</sub> from recirculating LAr in PuLArC. For instance, the R-LDH media reduced the O<sub>2</sub> contaminants concentration to 80% of its initial values after 200 min of LAr circulation. As for the reference media BASF Cu-S0226, this media reduced the O<sub>2</sub> concentration to 40% of its initial value in the same time window. The performance/kg of the studied media will be compared and we will discuss the putative higher potential of the innovative Ce-doped and pure R-LDH media for O<sub>2</sub> capturing in LAr which may invoke further tests of these media in larger scale LAr cryostats, possibly at Fermilab and CERN.