



Contribution ID: 2

Type: **Presentation**

Liquid xenon in nuclear medicine: state-of-the art and the PETALO approach

Friday, 22 September 2017 15:20 (40 minutes)

Liquid xenon has several attractive features, which make it suitable for applications to nuclear medicine, such as high scintillation yield and fast scintillation decay time.

In this talk, I will review the state of the art of the investigations of liquid xenon in medical imaging and I will describe the PETALO (Positron Emission Tof Apparatus with Liquid xenOn) concept, a novel idea, which combines liquid xenon scintillating cells and silicon photomultipliers for the readout. A first Monte Carlo investigation has pointed out that this technology would provide an excellent intrinsic time resolution, which opens the possibility of measuring the Time-Of-Flight with high efficiency. Finally, I will explore the possibility of exploiting both scintillation and Cherenkov light for a high-sensitivity TOF-PET.

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Session Classification: Keynote: Overview Talks

Track Classification: Applications (dark matter, neutrino, precision frontier, medicine, etc.)