**XVIII Workshop on Neutrino Telescopes**
**Palazzo Franchetti – Istituto Veneto**
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# Poster Session
# Submission of Abstract

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Title of the Poster:

Dual-Phase Liquid Argon Detector for Reactor Coherent Neutrino Scattering

Abstract Text: (no longer than 800 characters)

The Coherent Elastic Neutrino-Nucleus Scattering (CENNS) is a neutral current process with a cross-section approximately proportional to $N^2$ (where N is the number of neutrons in the nucleus) due to the coherence enhancement factor. In order to satisfy the coherence condition, neutrinos with energies less than 50 MeV are mostly preferred.

The COHERENT collaboration observed this process at a 6.7-sigma confidence level, using a low-background, 14.6-kg CsI[Na] scintillator exposed to the neutrino emissions from the Spallation Neutron Source (SNS) at Oak Ridge National Laboratory in 2017. For the future reactor neutrino CENNS measurement, the lager volume and low threshold detector technology are required.

The dual-phase liquid argon time projection chamber (TPC) is designed and in building for the reactor neutrino CENNS research. The prototype is planned to put near the core of Taishan reactor at the distance of 31m. The power of the Taishan reactor (located in Guangdong province) is 4.6GW. The TPC is designed as a cylinder and the mass of liquid argon is about 200kg. Three electrodes are used to generate the drift field, extraction field and collection field, respectively. Gas pocket is generated by the vaporization of the liquid argon which thickness is 10mm. The grid is placed below the gas-liquid interface 5mm. The inner container is made of acrylic material to reduce the radio activities background. SiPMs are used to collect S1 and S2 signals instead of photomultiplier tubes (PMTs). Properties of SiPM and acquisition systems at low temperature are under study. To obtain the low threshold results, e.g , 0.1keV incoming electron, only S2 signals are collected.

To detect the low recoil energy in the dual-phase liquid argon TPC, quenching factor or scintillation efficiency have to be precise determined. Generally, the electron recoils are taken as no quenching effect and set to be unit. In order to determine the quenching factor, nuclear recoil energies should be measured. So quenching factor measurement is a short-term plan in our consideration, and the prototype are also for this purpose.

Summary: (no longer than 400 characters. Insert a tag, key word, topic, etc.)

Key words: Dual-Phase Liquid Argon Detector, Reactor Coherent Neutrino Scattering, Near the core of Taishan Reactor, Silicon PM(SiPM), Low threshold, Quenching Factor.

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Kindly follow the instructions above and send the abstract (.pdf file) to mailto:salente@pd.infn.it by February 22nd 2019.
Response will be sent to the submitter's e-mail address indicated above, by March 1st.
Posters will be exhibited all week long at the workshop site. Discussion will take place on Thursday March 21st, during the Poster Party. At least one author must be available for "question-answer" time.
Best 3 posters will be awarded on Friday 22nd, during the closing plenary session of the workshop.