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Impact of the positive ion current on large size neutrino detectors and delayed photon emission

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Given their small mobility coefficient in liquid argon, the ions spend a considerably longer time in the active volume with respect to the electrons. We studied the effects of the positive ion current in a liquid argon time projection chamber, in the context of massive argon experiment for neutrino physics. The constant recombination between free ions and electrons produce a quenching of the charge signal and a constant emission of photons, uncorrelated in time and space to the physical interactions. The predictions evidence some potential concerns for multi-ton argon detectors.

Summary

The first part of the talks is based on the results published in *Astropart.Phys.* 92 (2017) 11-20, e-Print: arXiv:1609.08984 [physics.ins-det]

Newer results on the delayed light emission by secondary recombination will be also presented in the second part of the talk.

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