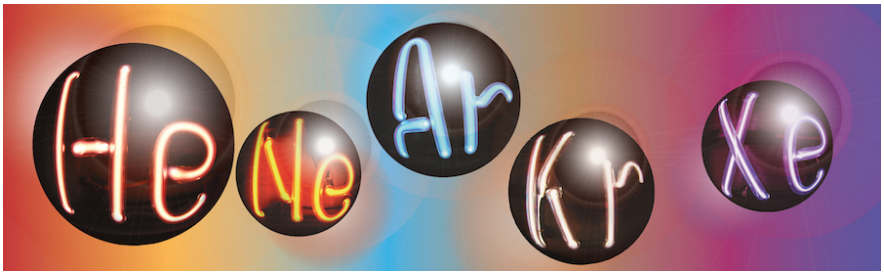

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Novel electron & photon sensing concepts of single-phase noble-liquid detectors

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Novel electron & photon sensing concepts of single-phase noble-liquid detectors

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Abstract
Some novel ideas of ionization-electron and scintillation-photon sensing concepts in single-phase noble-liquid detectors are presented. They rely on immersed micro-structured electrodes, undercoated with VUV photocathodes. Both radiation-induced electrons from the liquid and primary-scintillation photoelectrons emitted by the photocathode are collected on thin anode strips printed on appropriate insulators, or on nanostructured surfaces. This results in combined electroluminescence and small charge multiplication in the liquid. The resulting fast UV-photon flashes are detected by nearby photo sensors, e.g. SiPM or CMOS arrays. The multiplied single-photon light flashes should be detected above the dark noise of such sensors. Some of the proposed concepts, that permit both vertical and horizontal deployment of liquid-TPCs, are expected to resolve current liquid-to-gas interface issues in large-area dual-phase detectors in future Particle- and Astroparticle physics applications and in other fields.

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