

RF timer and RF timer-based electron, photon, and heavy ion sensors

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We propose a new radio frequency timer of keV energy electrons. By converting a time distribution of incident electrons to a hit position distribution on a circle, ellipse or spiral, by means of the radio frequency fields laying in the range 500-1000 MHz, this device achieves extremely precise timing. Streak Cameras, based on similar principles, routinely operate in the ps and sub-ps time domain, but have substantial dead time associated with the readout system. Here, we present a new type of RF timing technique, where the position sensor, consisting of microchannel plates and a delay-line anode, position information produces in the form of a \sim ns duration pulses and readout can be realized by using regular electronics. Measurements made with sub-ps duration laser pulses, synchronized to the radio frequency power, produced a timing resolution of \sim 10 ps. This ultra-high precision technique has potential applications in a large variety of scientific devices.

Requested length

10 minutes

Author: Dr MARGARYAN, Amur (A. I. Alikhanyan National Science Laboratory (Yerevan Physics Institute))

Co-authors: Prof. APRAHAMYAN, Ani (A. I. Alikhanyan National Science Laboratory (Yerevan Physics Institute)); Dr KAKOYAN, Vanik (A. I. Alikhanyan National Science Laboratory (Yerevan Physics Institute))

Presenter: Dr MARGARYAN, Amur (A. I. Alikhanyan National Science Laboratory (Yerevan Physics Institute))

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