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Advanced Radio Frequency Timing Apparatus: Technique and Applications in High Energy Nuclear Physics

A new type of radio frequency timer of keV energy electrons will be presented. It is based on a helical deflector, which performs circular or elliptical sweeps of keV electrons, by means of radio frequency fields in a frequency range of 500–1000 MHz. By converting a time distribution of incident electrons to a hit position distribution on a circle or ellipse, this device achieves extremely precise timing. Detection of scanned electrons by means of a position sensitive detector based on the microchannel plates produced a timing resolution of 10 ps, which can be potentially improved to 1 ps and sub-picosecond range. The applications of the technique in high energy nuclear physics, in particular, in hypernuclear lifetime measurements and fission isomer studies will be discussed.

Collaboration / Activity

RF Timer collaboration

Primary author: Dr ZHAMKOCHYAN, Simon (A. I. Alikhanyan national science laboratory (Yerevan Physics Institute))

Presenter: Dr ZHAMKOCHYAN, Simon (A. I. Alikhanyan national science laboratory (Yerevan Physics Institute))

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