

## Presence of scattering in the neutron measurements obtained from a kilojoule plasma focus device

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### Abstract

The parameters regarding neutrons emitted from plasma focus devices could be ill-estimated because of the presence of scattering, which invokes the necessity to discard the scattering contribution in the final estimated quantities such as neutron yield and energies. The scattering component is space specific. Therefore, it is desirable to identify if the measured signals contain significant scattering components for a given space configuration. To do so, in the present work a kilojoule plasma focus device (situated at P2MC center, CCHEN, Santiago, Chile), PF-2kJ, is used to study the neutron emission using two He3 nuclear detectors and pairs of photomultiplier tubes. The former detectors provide neutron yield and the latter are used for neutron energy estimation. The He3 measurements reveal that the principle signals are mixed with the scattered neutron signals, however, the photomultiplier tube pair showed time-separated signals that allowed the distinction between scattered and direct neutron signals. Direct neutron signals were used for neutron energy estimation. A characteristic signal obtained from the photomultipliers tube pair is shown in figure 1.

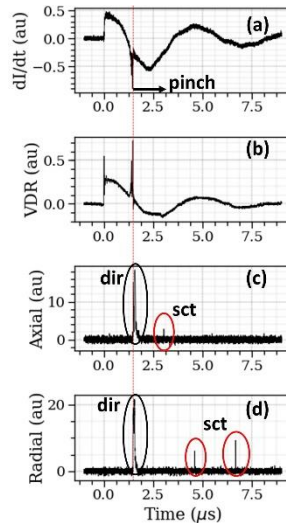


Figure 1: One of the representative electrical signals of (a) current derivative, (b) voltage, and neutron signals in photomultiplier tubes in the (c) axial direction and (d) the radial direction. Direct (dir) and scattered (sct) signals are distinguishable.

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