

Pulsed positron beamline at BARC, India- preliminary results

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We present the preliminary results from the pulsed positron beamline being setup at BARC, Mumbai, India. The pulsing setup is based on the design of Suzuki et al [1] and consists of 3 grid-chopper, two-gap prebuncher and buncher (resonant cavity). A 250 eV positron beam with 15 eV energy spread is produced by biasing a W(100) moderator. The fast positrons are filtered using ExB field. The DC beam is chopped into ~ 6ns pulses by a 37.5 MHz ($f/4$, $f= 150$ MHz) sinusoidal waveform riding on appropriate DC offset applied to the middle mesh of the chopper assembly[2]. A double gap prebuncher ($f/4$) time focusses the chopped beam into 1.5 ns pulses. A 150 MHz quarter wave resonator is used for final time focussing of the positron beam on to the sample in < 300 ps pulses. The annihilation gamma photon are detected by a cylindrical BaF2 scintillator based detector placed at 90 degrees to the sample. The spectrometer timing resolution was derived from fit results to be ~ 410 ps which is a combination of the timing spread in the positron pulse (<300 ps) and the detector timing resolution (280 ps). Preliminary data shows the ability of the spectrometer to measure and monitor long lifetime (~2.5 ns) component present in Nitrile Butadiene Rubber samples.

[1] R. Suzuki et al., *Solid State Phenomena*, **28-29**, 365 (1992)

[2] Masaki Maekawa et al., *Nuclear Instruments and Methods in Physics Research B*, **270**, 23(2012)