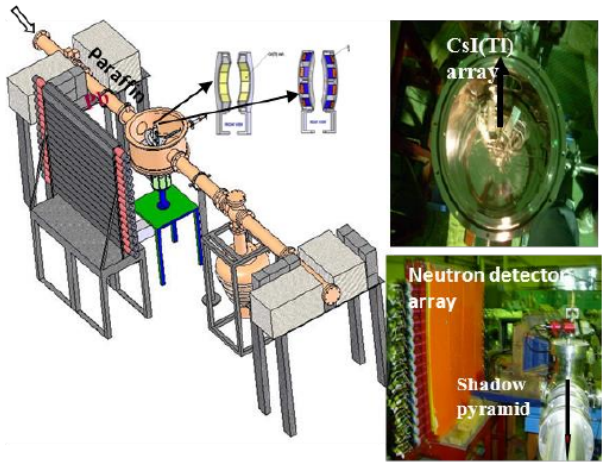
Large area plastic scintillator array for fast neutron measurements

A large area neutron detector array (~1m × 1m) has been set up and consists of 16 plastic scintillator bars of square cross section (see figure). Each bar has a size of 6 cm × 6 cm × 100 cm and is coupled to two 5 cm diameter XP2020 PMTs, one at either end.

Plastic scintillator detector array



Setup for measuring neutron TOF spectra using plastic scintillator array

The characterization of the plastic detector was done using radioactive sources and mono-energetic and continuum neutrons using beams from the PLF. The energy, time and position response has been measured for electrons using radioactive sources and for mono-energetic neutrons using the 7Li(p,n1)7Be*(0.429 MeV) reaction at proton energies between 6.3 and 19 MeV. The array has been used for fast neutron spectroscopy and can also be used for other measurements requiring a coincidence with neutrons. The array has been used to study of damping of nuclear shell effect in Pb region.