

Working status (Only NuGroup-Related)

Son Cao

March 30, 2018

Service works

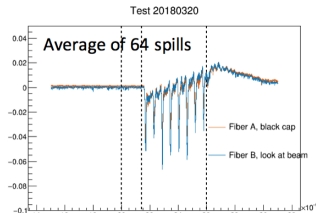
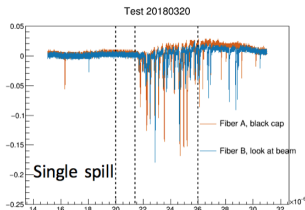
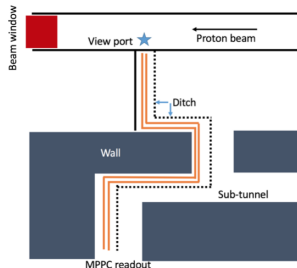
- ▶ Talks at conferences
 - ▶ “Latest results from T2K” at Moriond
https://indico.in2p3.fr/event/16579/contributions/60847/attachments/47265/59384/cvson_2018-Mar-Moriond_final.pdf-short.pdf
 - ▶ “Development of Optical System for Beam Induced Fluorescence Monitor at the J-PARC Neutrino Beamline”
https://www.dropbox.com/s/omlxozgh96b8ui5/201803_JPS_bif.pdf?dl=0
- ▶ Prepare website, help to build program for neutrino school and symposium this summer
 - ▶ School <http://ifirse.icise.vn/nugroup/vson/2018/>
 - ▶ Symposium <http://ifirse.icise.vn/nugroup/conf/nufrontier2018/>

Hardware works

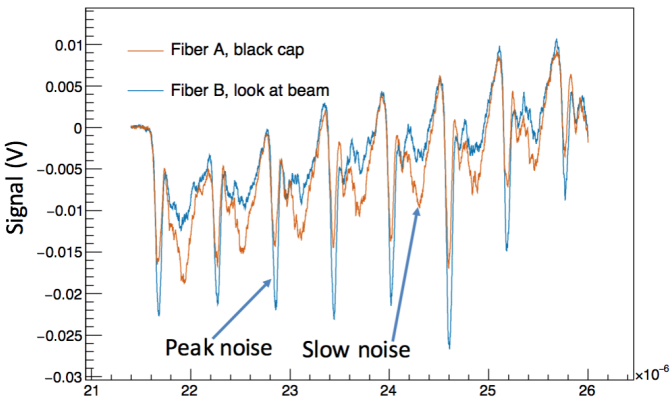
- ▶ Try to understand beam-induced background in the silica optical fiber used to transmit the light
- ▶ Building a complete readout system for BIF (4x4 MPPC arrays)
- ▶ Surprisingly, the method we using is quite similar to a “proton therapy dosimetry”, <https://www.osapublishing.org/ol/abstract.cfm?uri=ol-42-4-847>
- ▶ And Surprisingly, it can be use to monitor neutron radiation in the tunnel

Hardware works

- Two 40m-long optical fibers are used to check the beam-induced background: one looking at beam and other is with black cap. Fiber are guided from beamline to sub-tunnel and read out by MPPC
- MPPC signal is recorded with oscilloscope, either single spill or average of 64 spills, bunch structure become clearer
- The MPPC signals here should not be from the fluorescence light induced by proton-gas interaction in the beamline, but noise induced by the proton beam



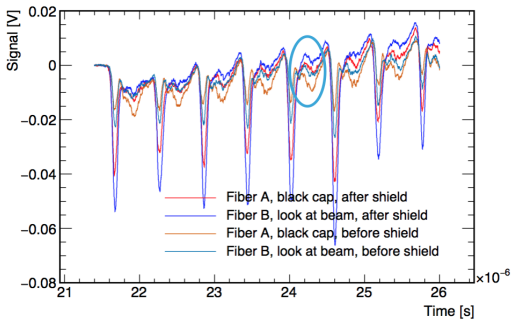
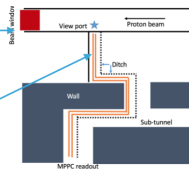
Hardware works

Take average of ~ 1000 spills

- Observed 8-peak noise structure corresponds to the 8-bunch J-PARC beam structure; slower noise structure is also observed

- Peak noise is suspected to be Cherenkov light while slower noise can be from

Hardware works



- Noise reduced in slower part
- Peak noise likely depends on beam condition

Hardware works

- Move fiber to the tentatively designated position, i.e more upstream and if the background is mainly from rescattering, it should be reduced. (This will be within next couple weeks)
- Using bandpass filter. It is suspected that part of background come from the Cherenkov light caused by charged particles induced by beam. This light might be in different range of wavelength to the BIF light (peak at 381nm)



Thorlabs FGB39

<https://www.osapublishing.org/ol/abstract.cfm?uri=ol-42-4-847>

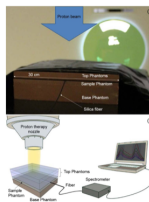


Fig. 1. (a) Geometry of the experimental design. (b) Schematic of the fiber diameter and the experimental setup design. The fiber was embedded in a clear-encasing phantom that allows adding additional slabs of plastic to change the depth of the measurement. The signal recorded by the fiber was transmitted to a spectrometer to measure the radiation dose.

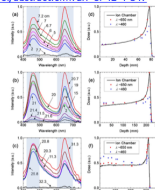
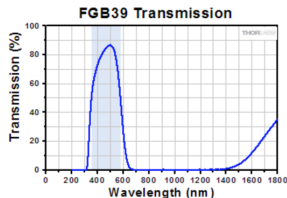


Fig. 2. (a)-(c) Set of spectra acquired from the fiber probe at various depths in a phantom irradiated with 100, 180, and 225 MeV energy proton beams, respectively. Two distinct intensity peaks are observed at 460 and 650 nm wavelengths. (d)-(f) Depth dose plots measured from the fiber and a standard ion chamber setup for 100, 180, and 225 MeV energy proton beams, respectively. The shaded area shows the spectral region over which the optical power was integrated. The signal corresponding to the second peak, i.e., 460-700 nm, is proportional to the dose.



Software/analyses works

- ▶ NEUT: Expect to include Van's result into the technical note and more polishing (next two weeks)
- ▶ Ngoc's paper: look promising! will check carefully next week
- ▶ Some exchange w/ Truong on WAGASCI software installation
- ▶ Check Ha's chapter 1 thesis and feedback
- ▶ Now also a convener of cross-section sub-group. Writing a strategy for this. Our group member might get benefit when joining later

- ▶ Good news, proposal to buy more hardware items to pursue MPPC study is accepted. Plan to buy in Japan and Van will bring back after visiting J-PARC (April 1-14th)
- ▶ Please help to check the website, especially the symposium. Will announce to many international collaborations
 - ▶ Nguyen T. K. Ha, & Nguyen H.D. Thanh, please submit application for the neutrino school.
- ▶ About Asia-Europe-Pacific School of High Energy Physics, please attend if possible. It's very good school as well.
- ▶ Nguyen H. Minh, master 2 in France, will have 3 months working on T2K, will be back to Vietnam from June 2018, would like to join the group. Meeting time is now not convenient for him. It's not easy to find better time. Few options
 - ▶ 11:00 VN (GMT+7), 23:00 Chicago time (GMT-5), 6:00 Paris time (GMT+2)
 - ▶ 21:00 VN (GMT+7), 9:00 Chicago time (GMT-5), 16:00 Paris time (GMT+2)
 - ▶ others?