Paper ID: THP28

APPLICATION OF FIBER BEAM LOSS MONITORING SYSTEM (FBLM) AND SCINTILLATOR BEAM LOSS MONITORING SYSTEM (SBLM) at HEPS

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Abstract

The High Energy Photon Source (HEPS) is a fourth-generation light source with a beam energy of 6 GeV currently under development by the Institute of High Energy Physics. The Beam Loss Monitor (BLM) system is designed for monitoring beam losses during machine commissioning. Two types of beam loss monitors have been installed in both the booster and storage ring. This paper introduces the principles and composition of these two BLMs, as well as their application in commission-ing.

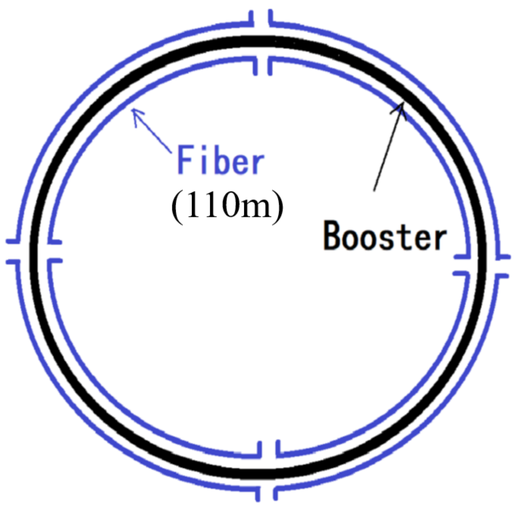
◆ *INTRODUCTION*

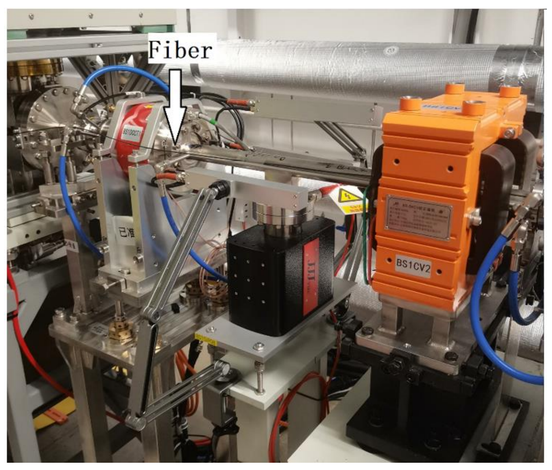
Beam Loss Monitor (BLM) systems are important part of the accelerators diagnostics. They are used during normal operation to identify and locate beam losses. To protect the HEPS commissioning, new Beam Loss Monitor (BLM) systems have been developed, installed and operated in HEPS. There are two types of BLMs at HEPS, including a fiber-optic beam loss monitor system (FBLM) for the booster and a scintillator beam loss mon-itor (SBLM) system for the storage ring. The design, installation and commissioning results are reported in this paper.

	Booster	Storage Ring
Circumference	450m	1500m
Energy	500MeV-6GeV	6GeV
BLM type	FBLM & SBLM	SBLM
Number of BLMs	FBLM :8 SBLM :27	201

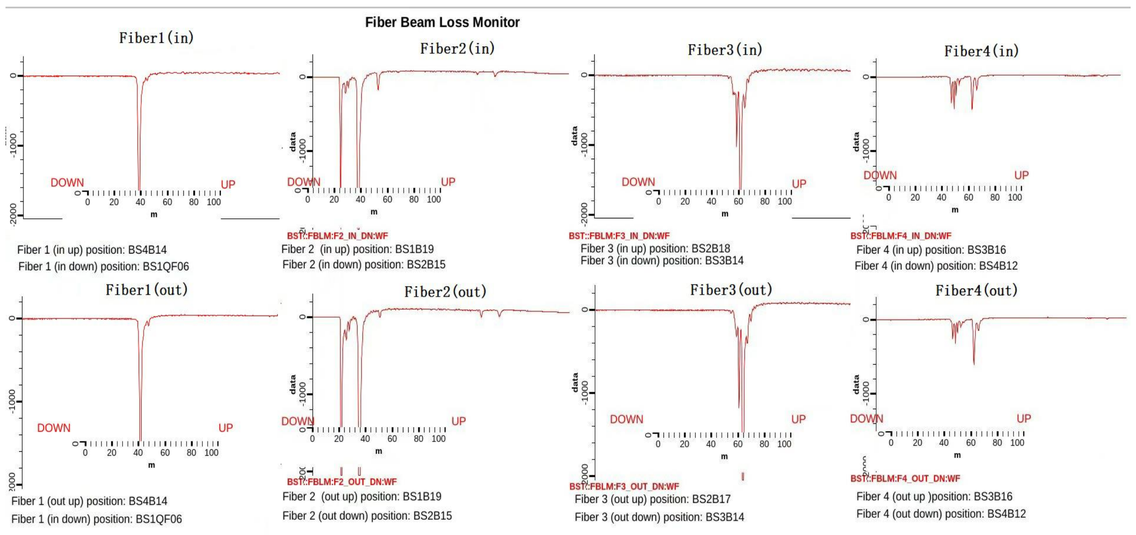
Type and number of BLM at HEPS

◆ *FBLMS IN THE HEPS BOOSTER*

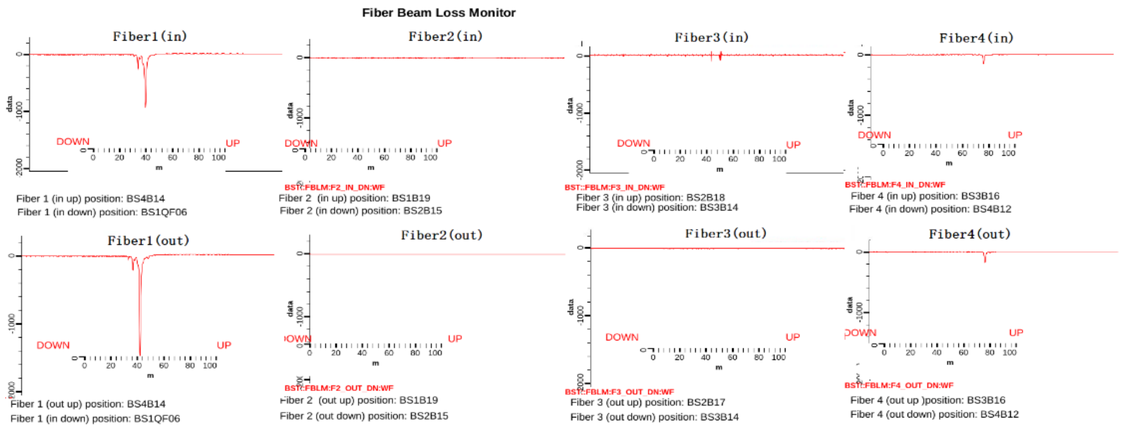




Schematic view and installation of the optical fiber

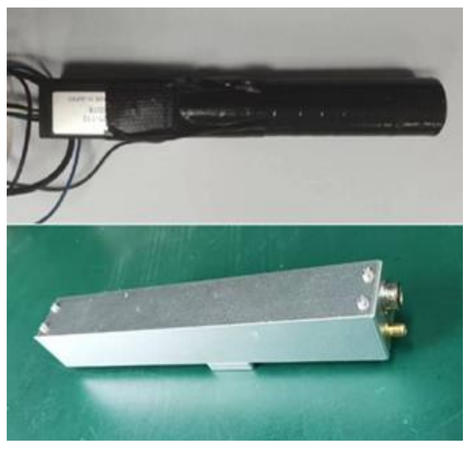


FBLM signals at early stage of commissioning



FBLM signals after commissioning for several weeks

◆ *SBLMS IN THE HEPS STORAGE RING*

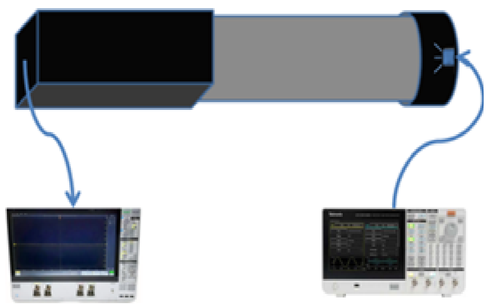


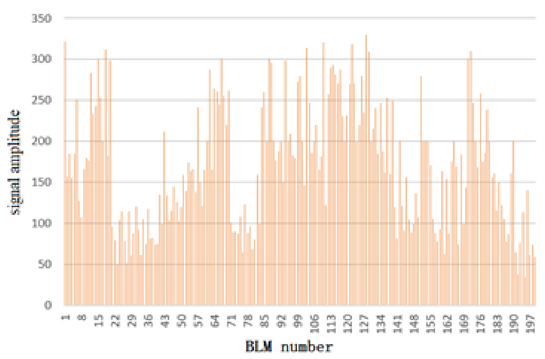
Scintillator-PMT system without and with the metallic monitors

SBLM on the inner side of bending magnets

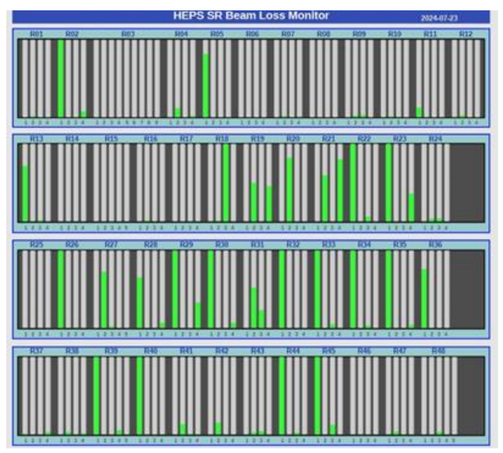
The selected PMT is a Hamamatsu H10721-110，coupling with EJ-200 scintillator rod.

Distribution of SBLMs in a cell for HEPS

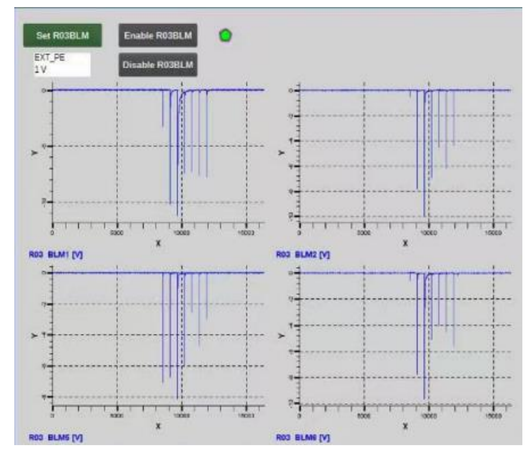




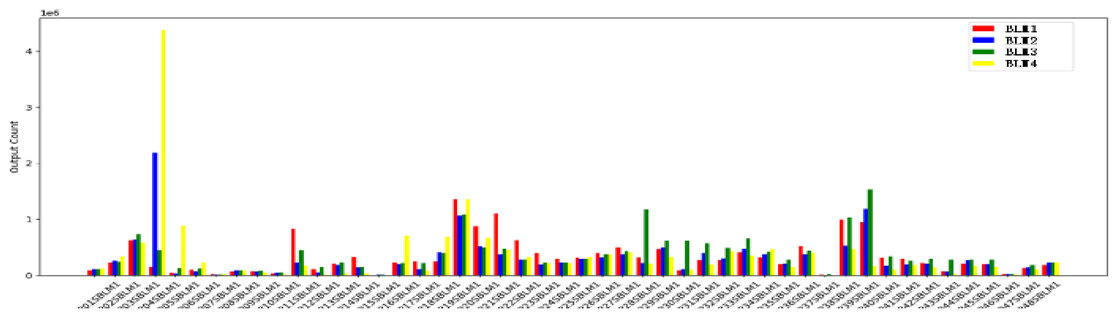
PMT sensitivity measured with blue LED



real-time beam loss status of the SR



turn by turn data of different SBLMs



accumulated beam loss status for the past hour

◆ *SUMMARY*

FBLMs and SBLMs are now operational to detect the losses at the HEPS booster and storage ring. Both the FBLMs and SBLMs are stable and reliable, can meet the require-ments of commissioning staff.