Experiment Proposal: AR_2012_No7

Title	Author/Spokesperson
Evaluation of PMTs for beam loss monitors	**A. Reiter (1431)** **T. Hoffmann (2318)**

Summary & Aim

- These tests are part of **FAIR R&D Beam Loss Monitors**
- **Data necessary to decide on candidate PMT/divider chain**
- Short summary: Direct comparison of photomultiplier tubes in high-rate applications:
  - Currently-used PMT Philips XP2972 and GSI-type active divider chain
  - Test candidate Hamamatsu R6427 and H7415mod active divider chain
- Slow extraction from SIS18 towards HTP beam line
- Requested beam time: 1 shift

Machine parameters

Machine	SIS18
Mode	Parasitic mode / B-exp
Exp. area	HTP
Ion species	any
Beam energy	any
Spill length	slow extraction (200 – 1500 ms)
Particle number	10^5 – 10^9
Repetition rate	0.1 Hz
Shifts	1
Beam Time Period	Autumn 2012 and later
Health & Safety	No issues

Experiment procedure

Check rate dependency of pulse height spectrum: Gain stability as function of mean PMT current

Experiment Setup		
Exp. area	HTP	
Description of setup	2 PMTs mounted on ends of BC400 scintillator bar (300 mm) Setup mounted on vertical drive behind the last diagnostics chamber 2 options: existing pneumatic drive (positions: in/out of beam) or stepper motor drive to adjust particle rate in parasitic operation	
Duration of setup	Non-interceptive in outer end position of pneumatic actuator or stepper motor drive. Setup does not disturb other experiments	
DAQ & Electronics Software	FESA DAQ Lassie (FAIR development) and fast oscilloscope (for pulse height investigations only; use programme of Timo for U-Boot)	
Trigger	Standard trigger for slow extraction	
Experiment Preparation / Required support **Estimated amount of time, manpower and equipment**		
Estimates or simulations	1 day	Calculation of signal (AR)
Mech.	Yes	(Vertical drive unit, if possible)
Workshop		Mounting of PMT setup on pn. actuator/stepper drive
Beam Line Installation	(Yes)	(Mech. Workshop)
Electronics & DAQ	3 d	(Connection of drive unit to stepper motor controller) AR+TH: Front-end and DAQ electronics HB: Lassie system in AP container
Control System Integration	Possible	Connection of motor controller to NODAL or other ACS software??? Stand-alone solution???
On-site Tests	2 d	AR
Modification of exp. area	(Yes)	(Mounting of vertical drive unit)
Dismantling of setup	4 h	
Remarks & Comments		
Setup of PMT array could be mounted on existing pneumatic drive. In this case, parasitic data taking is not possible! Dedicated shift with max. rate of 5 MHz.		