

# BD Controls

What I figured out up to now

# Contents

- Introduction
  - Professional background
- BD Overview
- BD in the LEBT
  - Monitors
  - Measurements
  - Outlook
- Summary

# Introduction

- Anton Kerschbaum
  - From Vienna, Austria
  - With MedAustron/BD since 1<sup>st</sup> September 2010
  - Responsibilities in BD group
    - Controls
    - Data acquisition, -conditioning and -presentation
    - Interfacing with MACS
- Professional Background
  - HTL Wien 10 for electrical engineering
  - Electrical engineering at TU Wien (Bachelor level)
  - Six years experience in DAQ and controls with LabVIEW

# BD Overview

Monitor type	LEBT	RFQ + LINAC	MEBT	Synchrotron	HEBT
Faraday Cups	×		×		
Slit Plates	×		×		
Wire Scanners	×				
Faraday Cup Cylindrical	×				
AC Current Transformers	×	×	×	×	
DC Current Transformers				×	
Profile/Harp Grids	×		×		
Position Pickups			×	×	
Phase Pickups		×	×		
Schottky Pickups				×	
Residual Gas Profile Monitor				×	
Diamond Detector				×	
Luminescent Screens				×	
Qualification Monitor					×
Scintillating Fiber Hodoscopes					×

# BD in the LEBT – Monitor Types

## Classification of BD monitors

- By measured variable
- By measurement principle
- ...
- By motion system

LEBT		
Actuated electrically	Actuated pneumatically	No motion system
Slits	Faraday Cups	Current Transformers
Wire Scanners	Profile grids (harp grids)	Faraday Cup Cylindrical

# BD in the LEBT – Monitor Types

- Actuated electrically: *Brushless motion system*
- Actuated pneumatically: *Pneumatic motion system*

Component	Brushless	Pneumatic
Control	PXI w/ Motion Controller	PXI w/ Relay Card
Conditioning	Custom Interface + Safety	Custom Safety System
Amplification	Mitsubishi Motor Driver	Festo Solenoid Valve
Actuation	Mitsubishi Brushless Motor	Festo/Norgren Piston

# BD in the LEBT – Measurements

- Different measurements and methods
- For LEBT
  - Beam position
  - Beam intensity
  - Beam profile
  - Emittance

Measurement	Slits	Wire Scanner	Faraday Cup	Profile Grid
Beam position		×		×
Beam intensity			×	
Beam profile		×		×
Emittance	×	×		

# Outlook I

## Until next MACS week in December

- Get acquainted with FECOS framework
- Implementation of motion control
  - Using FECOS framework
  - Timings acquired locally
  - Foresee transition to global timings
  - Focus on ITS in Mid 2011
- Creation of BD Motion Test Stand (MTS)
- Definition of interfaces to Tier 3
  - Together with CO group



# Outlook II

- BD MTS
  - Easy access to motion control
  - Basis for quick deployment of test routines
  - Rudimentary DAQ
- ITS
  - Local timing system
  - Local interlock system
  - Procedures (emittance measurement)
  - Custom DAQ with local GUI
- Development using FECOS framework

# References

- F. Osmic: Beam Diagnostics and Instrumentation;  
PP-090506-a-FOS
- E. Sargsyan: MedAustron Injector Test Stand;  
PP-091214-a-ESA