Fermilab

U.S. DEPARTMENT OF ENERGY | Office of Science

MEBT and Chopper – FY15 Budget Request

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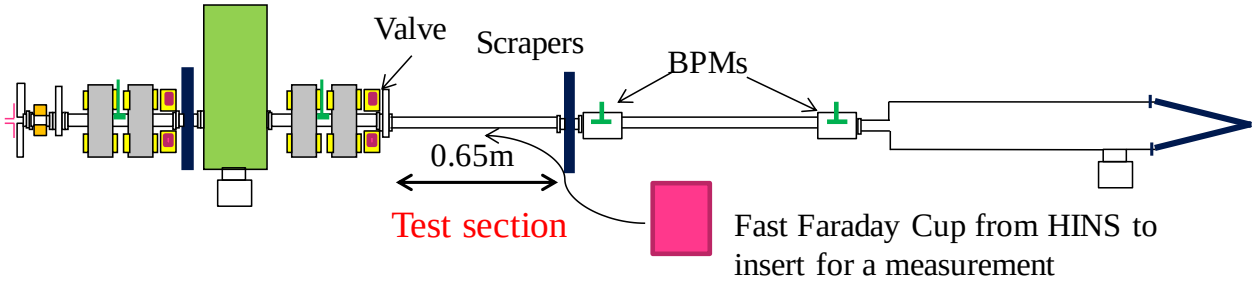
PIP-II Budget Retreat

July 22, 2014

PIP-II MEBT and Chopper – FY15 Budget Request- FY15 Initial Goals

- Installation of MEBT with required quads, correctors, instrumentation for the one buncher configuration



- Support RFQ beam commissioning
- Test prototype kicker at power level consistent with PIP-II operations
- In addition, this budget request includes efforts and money required for preparing a full – length MEBT in FY16
  - Mainly long-lead items
  - Also, items common for entire PXIE line: vacuum, 3D model

PIP-II MEBT and Chopper – Resources Required to Meet Initial Goals

Initial Budget Request for 120A.02.03.04 - SC Linac Front End MEBT and Chopper

	FTE	SWF	M&S	Tot. Directs
Initial Target	4.05	$ 533,790	$ 300,000	$ 833,790
Current Request	5.60	$ 680,698	$ 700,000	$ 1,380,698
(Over)/Under Target	**(1.55)**	**$ (146,908)**	**$ (400,000)**	**$ (546,908)**

- Difference in FTE:
  - so far, no single MEBT element has been manufactured or even fully designed, which requires significant efforts
  - No design of the initial beam characterization line as well
- The main difference in M&S is the request to buy
  - 3 bunching cavities ~200k$
  - 5 RF amplifiers (3 for MEBT + 1 spare + 1 for HWR) ~250k$ - this will be purchased with “FY14 funds for FY15 expenditures”

PIP-II MEBT and Chopper– FTE – By Category, Role and Div.

FTE - By Job Category - - Job Role - Staff Name - Home D/S/C
For PIP-II Task 120A.02.03.04 - SC Linac Front End MEBT and Chopper

Category	Role	Staff Name	Home DSC	Tot. FTE	SWF Before OH
Design	Mechanical Designer	Coghill, Jodi A	TD	0.10	$ 11,180.08
		Hamerla, Timothy W	AD	0.30	$ 33,540.23
		Oplt, Scott A	AD	0.50	$ 55,900.38
	Mechanical Drafter	Pirtle, Eric J	AD	0.10	$ 8,204.63
Design Total				**1.00**	**$ 108,825.31**
Electrical Technician	Electrical Technician Supervisor	Brooker, Robert A	AD	0.30	$ 38,585.94
	Electronics Technician	Bulmahn, David L	AD	0.10	$ 9,654.13
		Simmons, Jeffrey A	AD	0.45	$ 43,443.58
Electrical Technician Total				**0.85**	**$ 91,683.65**
Mechanical Engineer	Mechanical Design Engineer	Unknown	AD	0.30	$ 36,598.23
		Andrews, Richard A	AD	0.30	$ 36,598.23
		Baffes, Curtis M	AD	0.40	$ 48,797.64
		Chen, Zuxing	AD	0.40	$ 48,797.64
		Ristori, Leonardo	TD	0.20	$ 24,398.82
Mechanical Engineer Total				**1.60**	**$ 195,190.58**
Electrical Engineer	RF Design Engineer	Pasquinelli, Ralph J	AD	0.05	$ 6,099.71
		Sun, Ding	AD	0.20	$ 24,398.82
	Electronics Design Engineer	Saewert, Gregory W	AD	0.40	$ 48,797.64
Electrical Engineer Total				**0.65**	**$ 79,296.17**
Scientist	Accelerator Physicist Experimental	Shemyakin, Alexander V	AD	0.90	$ 142,729.44
Scientist Total				**0.90**	**$ 142,729.44**
Mechanical Technician	Mechanical SRF Technician	Franck, David	AD	0.25	$ 21,314.31
	High Vac Technician	Sylejmani, Sali	AD	0.15	$ 13,339.03
Mechanical Technician Total				**0.40**	**$ 34,653.34**
Operations	Accelerator Systems Specialist	Hanna, Bruce M	AD	0.20	$ 28,319.19
Operations Total				**0.20**	**$ 28,319.19**
Grand Total				**5.60**	**$ 680,697.68**

- Efforts related to water, cabling, controls, and most of instrumentation are not included
  - As well as others <0.05FTE
- The request includes some of PXIE design efforts
  - Vacuum
  - 3D model
- 5.6FTE vs 4.05 “base”

PIP-II MEBT and Chopper– M&S

Item	k$
Dump vacuum chamber and supports	20
Vacuum equipment (pumps, valves etc.)	70
2 scraper set (4 scrapers each)	30
Movable BPM (ToF)	10
Electronics for 5 BPMs (X+Y)	30
Other diagnostics, controls, MPS	20
Buttons for all BPMs	20
2 Doublet vacuum chambers	10
Magnet power supplies (racks)	20
200 Ohm kicker	20
3 bunching cavities	200
5 RF amplifiers 3kW	250
Total	**700**

Will be ordered with FY14 funds

- The scenario assumes assembling a full – length MEBT in FY16
  - Prototypes in sections
  - Long-lead items
  - Magnet PS racks
  - Diagnostics development
- Re-using Ecool and HINS equipment
  - Most of Quads PSs
  - Correctors PS (need re-building)
  - Scrapers/diagnostics drives

PIP-II MEBT and Chopper – Achievable Goals at Initial Target

Category	Initial Target	Goal 1	Goal 2	Goal 3	Goal 4	Tot. Of New Goals
FTE	4.05	-	-	-	-	-
M&S	$ 300,000	$ -	$ -	$ -	$ -	$ -

- With the budget at the initial level, we can finish all started in FY14:
  - Testing of prototypes of both kickers, buncher, and absorber
  - Procure scrapers
- Design, manufacture, and install one-buncher configuration
  - Should be enough for RFQ beam characterization
- Minimum efforts to full MEBT design and procurement
  - No bunchers (with RF amplifiers ordered with FY14 funds)
  - No MEBT design
  - No chances to assemble a full- length MEBT in FY16

PIP-II MEBT and Chopper – Achievable Goals at Initial Target less 10%

Category	Initial Target	Less 10%	Goal 1	Goal 2	Goal 3	Goal 4	Tot. for 10%
FTE	4.05	3.65	-	-	-	-	-
M&S	$ 300,000	$ 270,000	$ -	$ -	$ -	$ -	$ -

- In this scenario, the progress is limited by labor
- In addition to finishing FY14 jobs, only a short setup to accept the RFQ beam
  - No quads or buncher, minimum diagnostics