

<b>Title</b>	<b><i>Three-screen emittance measurement for PAR (bypass)</i></b>			
Project Requestor	William Berg			
Date	05/16/2008			
Group Leader(s)	Glenn Decker			
Machine Manager	C. Y. Yao			
Category	Accelerator Improvement			
Content ID*	APS_XXXXXX	Rev.	ICMS_Revision	ICMS Document Date

\*This row is filled in automatically on check in to ICMS. See Note <sup>1</sup>

**Description:**

<b>Start Year (FY)</b>	<b>2009</b>	<b>Duration (Yr)</b>	<b>1</b>
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**Objectives:**

Provide a high resolution three-screen emittance measurement system in the PAR bypass transport line in support of LEUTL hall crab cavity system tests, top up, direct injection, linac studies, and gun development programs.

**Benefit:**

The current PAR bypass system incorporates YAG crystals which are inherently resolution limited. The beam quality that is produced by some of our operating modes exceeds the existing capabilities of this diagnostic. The new system will allow a selectable high resolution mode for measurement of beam emittance, transverse profile, centroid, and position. In addition, the upgrade provides for computer automation of the emittance measurement.

See OAG request for further justification.

**Risks of Project:** See Note <sup>2</sup>

Very limited impact. Access to the beam line vacuum system is required for the upgrade of the scintillator components. This type of access would be considered routine.

**Consequences of Not Doing Project:** See Note <sup>3</sup>

System design deficiencies give rise to insufficient beam analysis capabilities for support of current operations/studies/development programs and diminishes our ability to provide appropriate maintenance and repair of these systems.

**Cost/Benefit Analysis:** See Note <sup>4</sup>

The upgrade will provide improved beam profile measurement capabilities, controls interface, and system reliability. This would improve operation's ability to quantify beam parameters and to reliably and consistently deliver the highest beam quality. System design would be commensurate with support of crab cavity testing and development programs.

**Description:**

Design and implement an upgrade to the existing three-screen YAG crystal based profile imaging stations. This would include upgrading or the addition of OTR targets, ccd cameras, optical transport, opto-mechanical manipulators, illumination control with read back, plc controls, shrouding, and shielding.

**Funding Details**

**Cost: (\$K)**

Use FY08 dollars.

Year	AIP	Contingency
1	100	5%
2		
3		
4		
5		
6		
7		
8		
9		
Total	100	5

Contingency may be in dollars or percent. Enter figure for total project contingency.

**Effort: (FTE)**

The effort portion need not be filled out in detail by March 28

APS Strategic Planning Proposal

Year	Mechanical Engineer	Electrical Engineer	Physicist	Software Engineer	Tech	Designer	Post Doc	Total
1	0.41				0.3	0.6		1.31
2								0
3								0
4								0
5								0
6								0
7								0
8								0
9								0

<sup>1</sup> **Notes:**

**ICMS.** Check in first revision to ICMS as a *New Check In*. Subsequent revisions should be checked in as revisions to that document i.e. *Check Out* the previous version and *Check In* the new version. Be sure to complete the *Document Date* field on the check in screen.

<sup>2</sup> **Risk Assessment.** Advise of the potential impact to the facility or operations that may result as a consequence of performing the proposed activity. Example: If the proposed project is undertaken then other systems impacted by the work include ... (If no assessment is appropriate then enter NA.)

<sup>3</sup> **Consequence Assessment.** Advise of the potential consequences to the facility or to operations if the proposal is not executed. Example: If the proposed project is not undertaken then \_\_\_\_ may happen to the facility. (If no assessment is appropriate then enter NA.)

<sup>4</sup> **Cost Benefit Analysis.** Describe cost efficiencies or value of the risk mitigated by the expenditure.

Example: Failure to complete this maintenance project will result in increased total costs to the APS for emergency repairs and this investment of \_\_\_\_ will also result in improved reliability of \_\_\_\_\_. (If no assessment is appropriate then enter NA.)