

Title	<i>PAR Low Emittance Lattice</i>			
Project Requestor	Michael Borland			
Date	March 21, 2008			
Group Leader(s)	Borland			
Machine or Sector Manager	CY Yao			
Category	Accelerator Hardware and ID Improvements			
Content ID*	APS_XXXXXX	Rev.	ICMS_Revision	ICMS Document Date

*This row is filled in automatically on check in to ICMS. See Note ¹

Description:

Start Year (FY)	2009	Duration (Yr)	3
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Objectives:

The purpose of this proposal is to perform R&D into improving the reliability, stability, and flexibility of PAR operation. This will be done by developing a lattice with lower emittance and momentum compaction factor.

Benefit:

More consistent delivery of bunches to the booster, particularly during top-up operation. Fewer operational issues that interfere with top-up.

Risks of Project: See Note ²

Low.

Consequences of Not Doing Project: See Note ³

Continued occasional operations issues that interfere with top-up and make system tuning difficult.

Cost/Benefit Analysis: See Note ⁴

This involves some simulation work and machine studies. The additional cost is negligible.

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Description:

This proposal is discussed in the context of a general PAR improvement initiative in Section 4 of OAG-TN-2008-008.

Simulation studies show that may be possible to run the PAR in a lower emittance configuration, which would drop the emittance by as much as 66%. This also lowers the momentum compaction factor from 0.25 to 0.20, which would give a somewhat shorter bunch, at some risk of beam instability. This could be dealt with using feedback or higher chromaticity. A program of lattice calibration is already underway that should lead to the ability to test such a lattice in the near future.

Funding Details

FY 08 \$

Cost (\$k)

Year	AIP	Contingency
1	0	
2	0	
3	0	
4		
5		
6		
7		
8		
9		
Total	0	

Contingency may be in dollars or Percent

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

Effort (FTE)

Year	Mechanical Engineer	Electrical Engineer	Physicist	Software Engineer	Tech	Designer	Post Doc	Total
1			0.1					0.1
2								0
3								0
4								0
5								0
6								0
7								0
8								0
9								0

¹ **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.

² **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.)

³ **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.)

⁴ **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.)