## Review of e- source for the low power Option and status update

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## Scope of talk

- Impact of reduced bunch number on laser system design
- Review source laser R&D
- Review timeline of bunch train demonstration
- Update on Jlabs gun design work
- Remaining source systems design is not discussed here → rely on main linac review for BAW
- Currently, NC RF system design remains at RDR level (no issues are anticipated)

#### Parameter comparison

Parameter	RDR	SB2009
Number of bunches	2625	1312
Repetition rate of macro bunch	5 Hz	5 Hz
Bunch Spacing	356 ns	670 ns
Beam Current	9.0 mA	4.8 mA

# Laser Physics $N(t) = \eta p \cdot \frac{Pp}{h \cdot vp} \cdot \frac{2}{\pi \left(\omega p^{2} + \omega p^{2}\right) \cdot 1} \cdot \tau \cdot \left(1 - \exp\left(\frac{-t}{\tau}\right)\right)$



Conclusion:

Bunch spacing of 670 ns results in more efficient amplifier pumping compared to 356 ns.

#### Status of laser system development

- Two similar laser systems are being developed:
  - 1. SLAC design
  - 2. SBIR laser system (KM Labs)
- Both systems share similar challenges
  - cw amplifier pump lasers
- KM Labs system has been operational at 1.5 MHz at KM Labs facility → inspected in October 2010
- Delivery in December 2010
- KM Labs and SLAC systems are now in the process of installation here at SLAC's ILC ITF

#### KM Labs system installation





### Test Cave issues at Jlab

- Renovation of Test Cave building at Jlab beginning of FY 2012 to early in FY2013
- May delay Test at Jlab
- Another issue is the lack of time resolution for polarization measurements.
- Priority issues for ILC (lab resources, facilities support for ILC R&D, manpower, etc.)

## Gun development at Jlab

Jlab's Inverted gun design



conditioned to 150kV without observed field emission

## Summary

- Source laser R&D and Gun R&D are progressing at SLAC and Jlab.
- Beam Test will take place at SLAC, at least for BAW parameters.
- Beam tests at Jlab may be delayed.