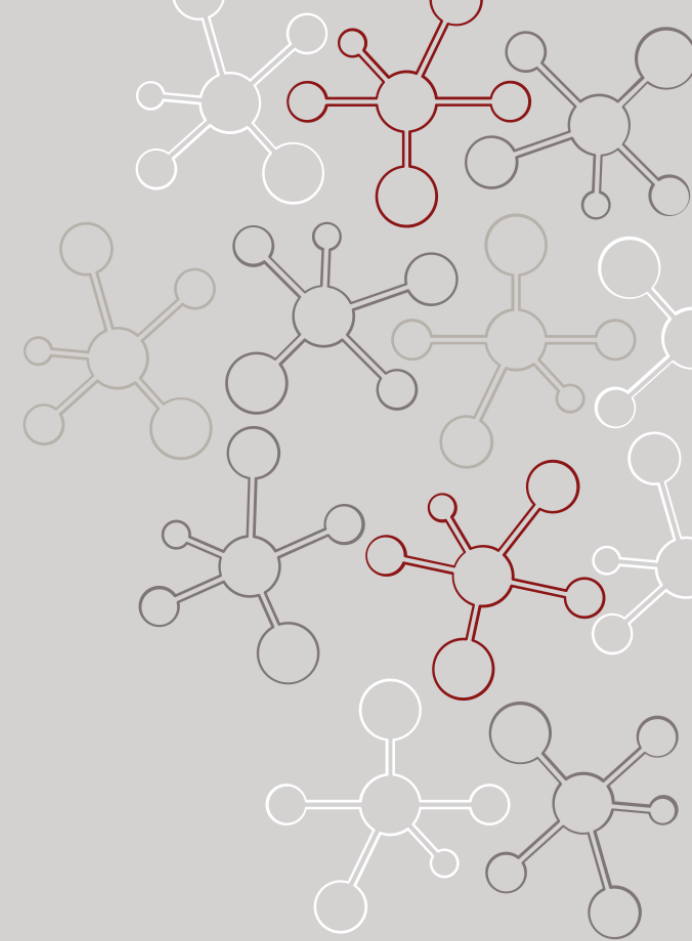


# AARD Longterm Planning

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01/10/24



# Overview / Discussion

- Everything we do should be reliable and repeatable, error bars!
  - Repeatable day-to-day and by others (documentation)
- We've had to change the way we model the accelerator since July 2023
- Currently we are working on infrastructure beam diagnostics
- Next is robustness, 'experiment' diagnostics - do experimental outcomes comport with beam diagnostics?

# Progress from July 2023

<i>What</i>	<i>When/Priority</i>	<i>Why</i>	<i>Who</i>
<i>Schottky Scan GUI</i>	<i>Done</i>	<i>Phase laser + RF</i>	<i>Spencer</i>
<i>Measure UV Pulse Length</i>	<i>Done</i>	<i>Get correct pulse length on cathode</i>	<i>Brendan</i>
<i>Laser Heater</i>	<i>Done</i>	<i>Less coherence</i>	<i>Claudio</i>
<i>Camera Watch Dog</i>	<i>Done</i>	<i>Protect cameras and experiments</i>	<i>Sharon</i>
<i>PB Window Open</i>	<i>Done</i>	<i>Minimize B-integral</i>	<i>Brendan</i>
<i>SYAG</i>	<i>Done</i>	<i>Single shot dispersion</i>	<i>Spencer</i>
<i>S20 Laser Wavefront</i>	<i>Done</i>	<i>Better laser</i>	<i>Robert + Alex</i>
<i>S20 Main Laser Collimation</i>	<i>Done</i>	<i>Better laser</i>	<i>Robert + Alex</i>
<i>S20 Energy</i>	<i>Done</i>	<i>Better laser</i>	<i>Robert + Alex</i>
<i>S20 Pulse Length</i>	<i>Done</i>	<i>Better laser</i>	<i>Robert + Alex</i>

# In progress as of January 2024

<i>What</i>	<i>When/Priority</i>	<i>Why</i>	<i>Who</i>
<i>Measure IR Pulse Length</i>	<i>High</i>	<i>Correct heating for single + two bunch</i>	<i>Claudio</i>
<i>Front End Stability</i>	<i>High</i>	<i>Front end instability trickles down the entire linac</i>	<i>Ryan</i>
<i>LCLS R matrix deployment</i>	<i>High</i>	<i>Bunch length, bumps, steering all need a model</i>	<i>David + Zack</i>
<i>Emittance Measurement</i>	<i>High</i>	<i>Need repeatable emittance measurements</i>	<i>Doug</i>
<i>Main Drive Line Feedforward</i>	<i>High</i>	<i>We want stable, repeatable beams</i>	<i>Sharon</i>
<i>S20 Bunch Length Feedback</i>	<i>High</i>	<i>There is an ATCA issue that needs sorting</i>	<i>Sean</i>
<i>Bunch Length Monitors</i>	<i>High</i>	<i>We want stable, repeatable beams</i>	<i>David + Zack</i>
<i>Transverse Monitor+Feedback</i>	<i>High</i>	<i>We want stable, repeatable beams</i>	<i>David + Zack</i>
<i>Generate Two Bunches</i>	<i>High</i>	<i>The ultimate goal - will take a while so start early</i>	<i>Nathan</i>
<i>Probe Collimation</i>	<i>High-ish</i>	<i>Enables/improves all the probe experiments</i>	<i>Alex</i>
<i>TCAV SLED Upgrade</i>	<i>High-ish</i>	<i>Will need to measure below 15 um bunch length</i>	<i>Doug</i>
<i>DAQ Upgrades/Fixes</i>	<i>High-ish</i>	<i>Want reliable, consistent data taking</i>	<i>Spencer</i>

# To do in 2024

<i>What</i>	<i>When/Priority</i>	<i>Why</i>	<i>Who</i>
<i>BBA</i>		<i>Multi-shot emittance measurements need no steering</i>	
<i>Laser Heater Match</i>		<i>Increase laser heating</i>	<i>Eric?</i>
<i>Double Laser energy in S10</i>		<i>Really, really increase laser heating</i>	<i>Brendan</i>
<i>S20 Energy Feedback</i>		<i>Stable energy, need R matrices deployed, BL and T feedbacks</i>	
<i>Dispersion GUI</i>		<i>Small spots in IP, need R matrices deployed</i>	
<i>Defender</i>		<i>No more demolition derby in the PB</i>	
<i>IP Jitter measurements</i>		<i>Waist and beam size measure in IP, need R matrices deployed</i>	
<i>DAN Fit Function</i>		<i>Make ad hoc analysis repeatable</i>	
<i>Beam tomography</i>		<i>Detailed beam distributions</i>	
<i>TCAV GUI Upgrade</i>			

# What is every doing?

<i>Person</i>	<i>1/5</i>	<i>1/5</i>	<i>1/5</i>	<i>1/5</i>	<i>1/5</i>
<i>Alex K</i>	<i>Probe Laser</i>	<i>E320</i>	<i>Lucretia to PIC connector</i>	<i>Meetings, Training</i>	<i>Science!</i>
<i>Claudio</i>	<i>S10 Laser</i>	<i>Feedbacks</i>	<i>ECA</i>	<i>Meetings, Training</i>	<i>ECA</i>
<i>Doug</i>	<i>Emittance Measurement</i>	<i>BBA</i>	<i>Diagnostics</i>	<i>Meetings, Training</i>	<i>Science!</i>
<i>Nathan</i>	<i>Two Bunch / S10 Laser</i>	<i>Two Bunch / S10 Laser</i>	<i>GPT+Lucretia Connector</i>	<i>Meetings, Training</i>	<i>Science!</i>
<i>Robert</i>	<i>S20 Laser</i>	<i>S20 Laser</i>	<i>S20 Laser</i>	<i>Meetings, Training</i>	<i>Science!</i>
<i>Robbie</i>	<i>ML</i>	<i>ML</i>	<i>ML</i>	<i>Meetings, Training</i>	<i>Science!</i>
<i>Spencer</i>	<i>PAMM Planning</i>	<i>DAQ</i>	<i>Global Simulation Effort</i>	<i>Meetings, Training</i>	<i>Science!</i>
<i>David</i>	<i>Model deployment</i>	<i>BL and T Feedbacks</i>	<i>BL and T Feedbacks / Ago</i>	<i>Ago</i>	<i>Ago</i>
<i>Sharon</i>	<i>MDL Feedbacks</i>	<i>MDL Feedbacks</i>	<i>DAQ/Cameras</i>	<i>Meetings, Training</i>	<i>Science!</i>
<i>Brendan</i>	<i>AARD Managing Stuff</i>	<i>AARD Managing Stuff / Laser</i>	<i>Laser</i>	<i>Meetings, Training</i>	<i>Science!</i>

# Planning and Goals

- Going to try planning “between two PAMMS”
  - Switch between ‘machine development’ and ‘experiments’
- Definition is rather loose between the two
- Want to make process regular and repeatable to remove pressure to ‘get things done now’

# Discussion

- Is there a disconnect between diagnostics and plasma?
- What else should be on these lists?