# **Community Input Survey Summary**

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## Outline

- Survey purpose
- Survey Structure
- Summary of responses
  - Demographic
  - Laser Parameters
  - Other Scientific Needs
  - Major Challenges
  - Key Milestones







## **Survey Purpose**

- Assess the needs of the scientific community in relation to high peak power mid-IR laser capabilities.
- Have a good understanding of the needs of the community to drive the future direction of mid-IR (9-11 µm regime) high-power laser development for strong-field research needs.
- Consider 3 main thrusts

Thrust 1: Topics in mid-IR laser research
Thrust 2: Topics in Laser-Plasma Interactions and Laser
Wakefield Acceleration
Thrust 3: Topics in laser-electron beam interaction







### Survey Structure

If your research needs are sensitive to the peak power that can be delivered, please indicate the peak power that will satisfy your needs:

Not applicable

	5 Years	Ultimate
< 1TW Peak Power		
1-10 TW Peak Power		
> 10 TW Peak Power		
Other Peak power		

Please explain your requirements if you selected "Other Peak Power" above.

- Combination of multiple choice and text answers
- Try to capture most desirable laser parameters and understand how broad a range of parameters is needed to satisfy the whole community.
- Gain an understanding of priorities to drive laser R&D.







### Demographic

How do your present or planned research goals utilize high-power mid-IR wavelength Lasers?



#### **Laser Parameters**

NATIONAL LABORATORY



Other pulse structure

> 100 J

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Other

ARS OF



**Test Facility** 

#### **Laser Parameters**



NATIONAL LABORATOR

- Linear polarization
- Circular polarization
- $M^2 < 1.2$
- Controllable contrast
- 2 um wavelength
- Diffraction limited focusing

5 Year

- < 100 um focus
- *a*<sub>0</sub> = 10

Accelerator

Test Facility

- Pulse shaping
- Higher-order modes



Ultimate



#### **Other Needs**









## **Major Challenges**

- Increasing repetition rate
- Pushing for higher peak power
- Pushing for shorter pulse length
- Addressing Efficiency
- Increasing Support







## **Key Milestones**

- 500 fs pulses
- a<sub>0</sub> > 1
  - 2 for access to bubble regime in plasma interaction
  - 2 for nonlinear electron beam interaction regime
  - 4 reach ideal blowout regime in plasma interaction
  - 7-10 ion acceleration, accessing relativistic transparency with gas target.







## If you have not yet participated ...

You may do so here:

https://surveys.external.bnl.gov/n/ATFScientificNee ds.aspx

Also linked from the conference website and indico agenda page





