

# Antihydrogen Laser Experiment Roadmap

## Steps Along on the Way

First Production

Quantum State Manipulations

Stable Trapping

Precision Spectroscopy

Planck Scale Physics  
CPT Violation  
Gravity

### Laser induced formation

- First laser-antiatom interaction
- $e^+$  temperature measurement
- 3-body plasma effects

### Two-step laser induced formation

- First bound-to-bound spectroscopy
- $\hbar$  velocity via Doppler width
- Resonant velocity selection

### Non-neutral plasma stability studies

- Resonant particle transport
- Trapped particle modes
- Quadrupole vs. multipole effect

### 1s-2s spectroscopy

- Comparison with hydrogen
- Resonant ionization
- Low field measurement

## Strengths and Expertise

- World's strongest cold  $e^+$  source
- Precision and high-power lasers
- Non-neutral plasmas