



# Visualizing the wakefields @ AWAKE

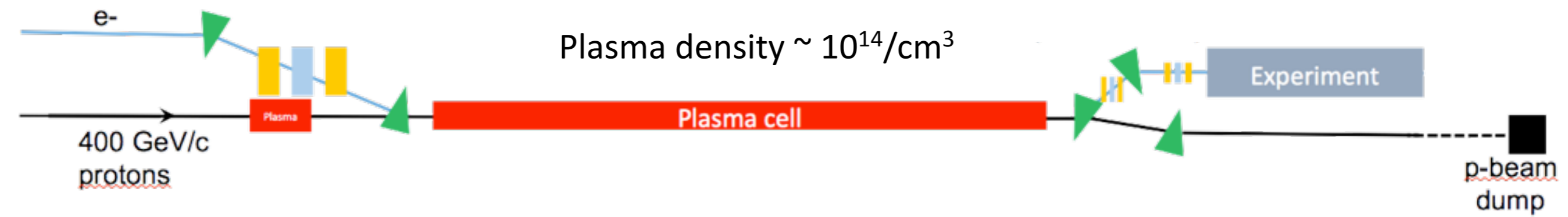
**Amrutha Gopal**

Friedrich-Schiller-University Jena,  
Helmholtz Institute Jena

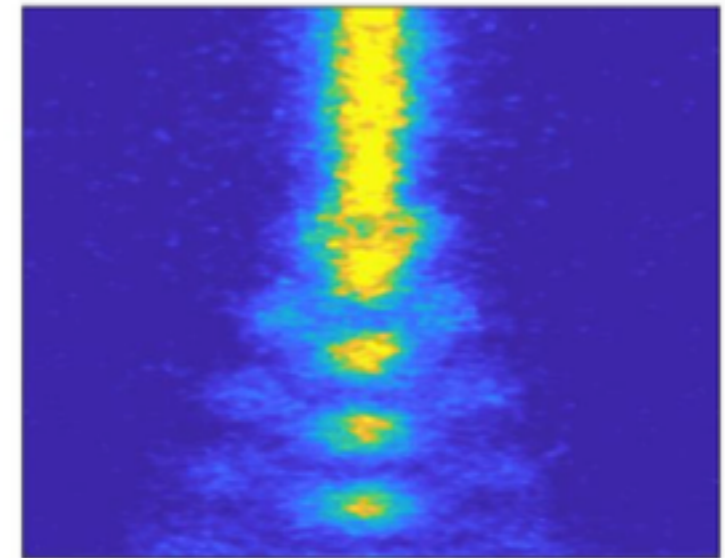
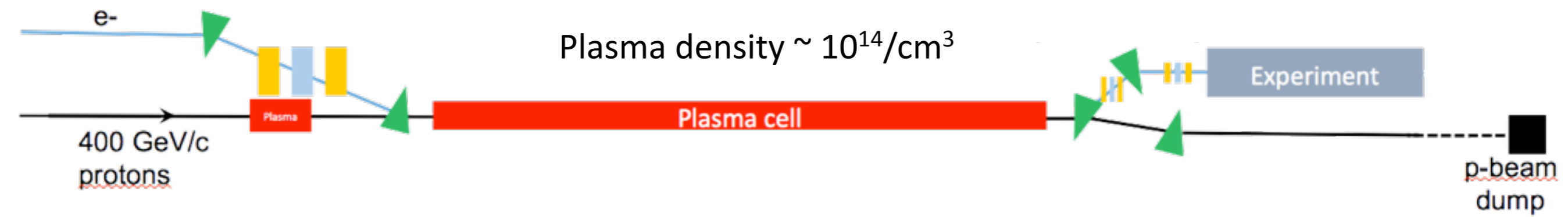
**Alexander Pukhov**

Heinrich-Heine-University Düsseldorf

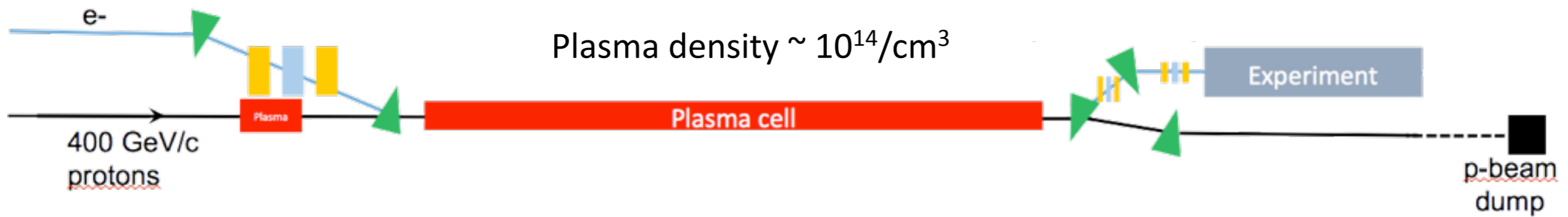
# Advanced proton driven plasma **WAKE**field acceleration experiment



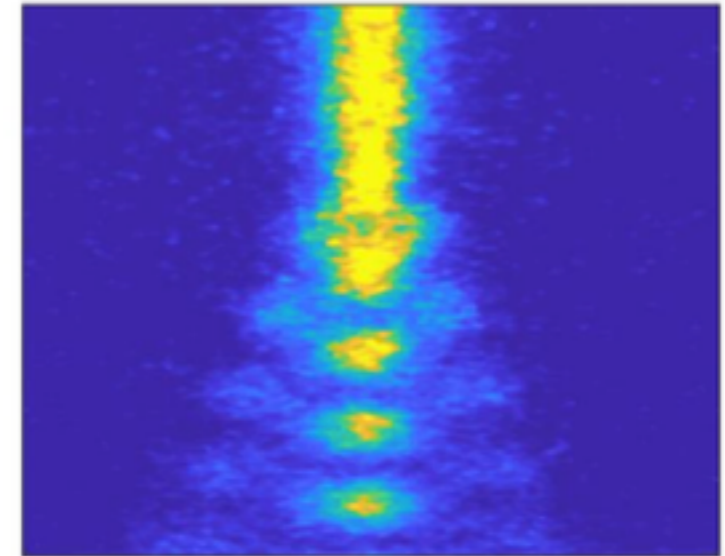
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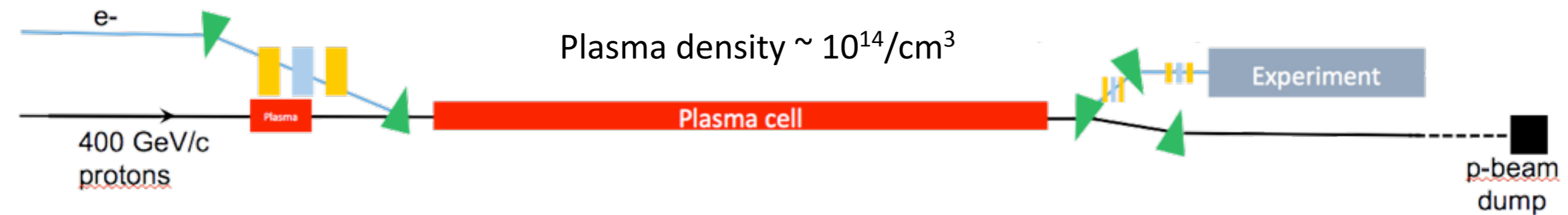
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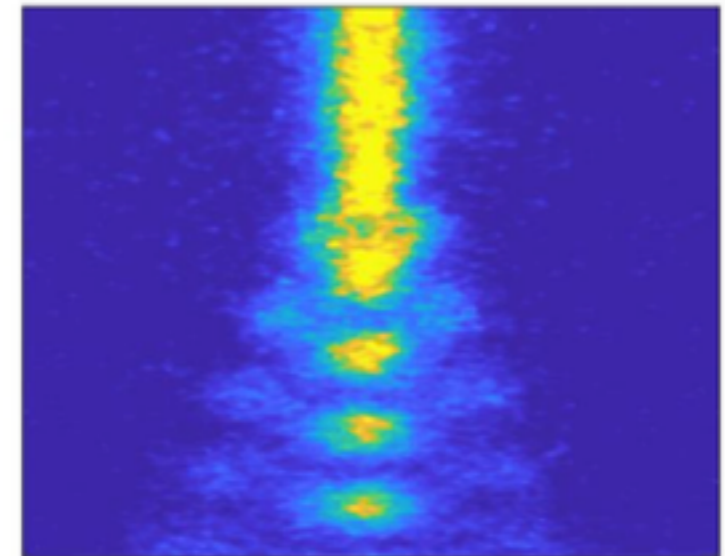
**Electron beam deterioration when crossing the plasma boundary- leading to low trapped charge**



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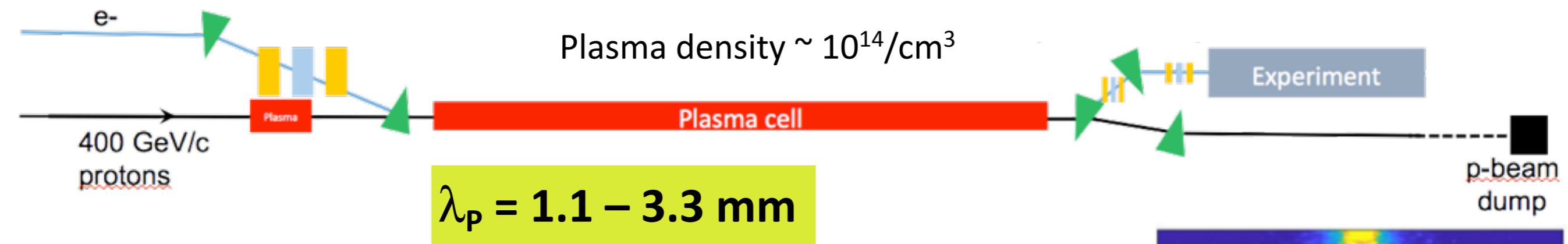
**Electron beam deterioration when crossing the plasma boundary- leading to low trapped charge**



## Required:

1. Visualization of the wakefield structure far from the head of the bunch (5-20 cm behind the head)
2. Wake evolution along the plasma column, (visualization at several places)
3. The plasma column quality: whether it is uniformly ionized.

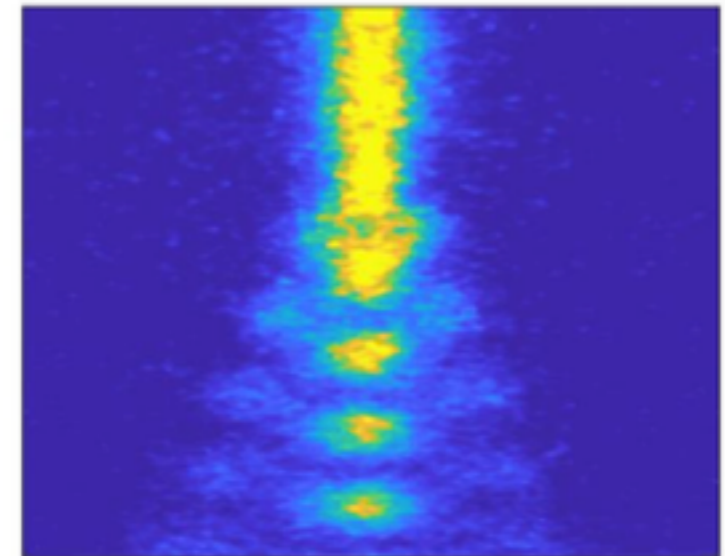
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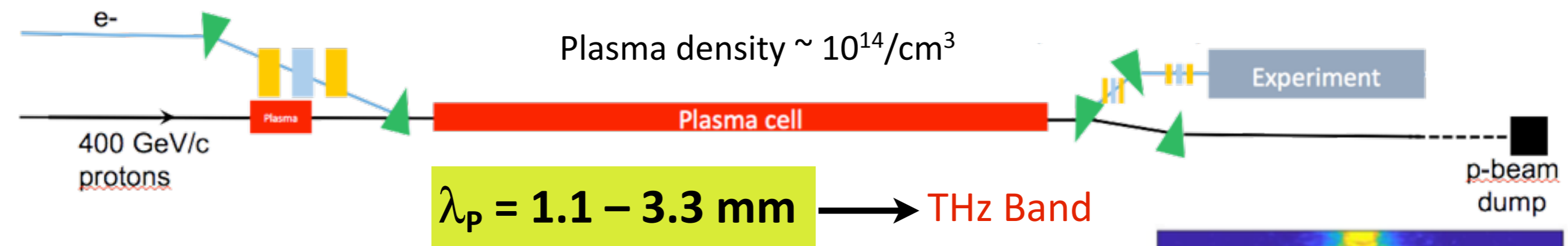
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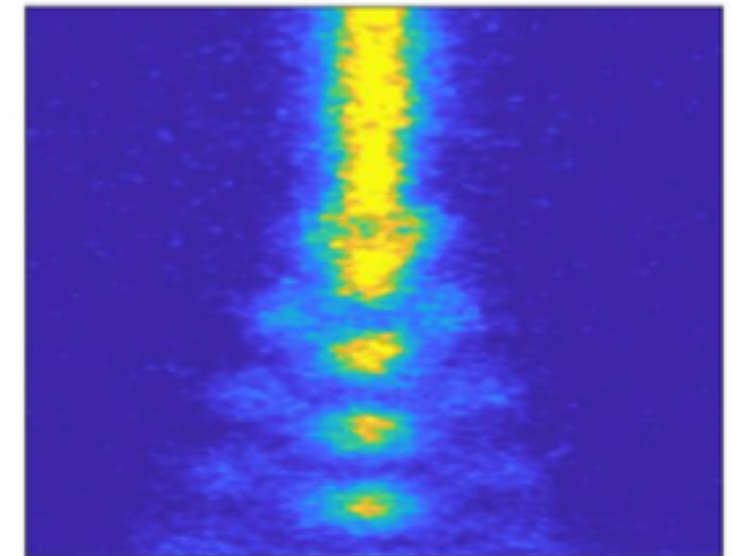
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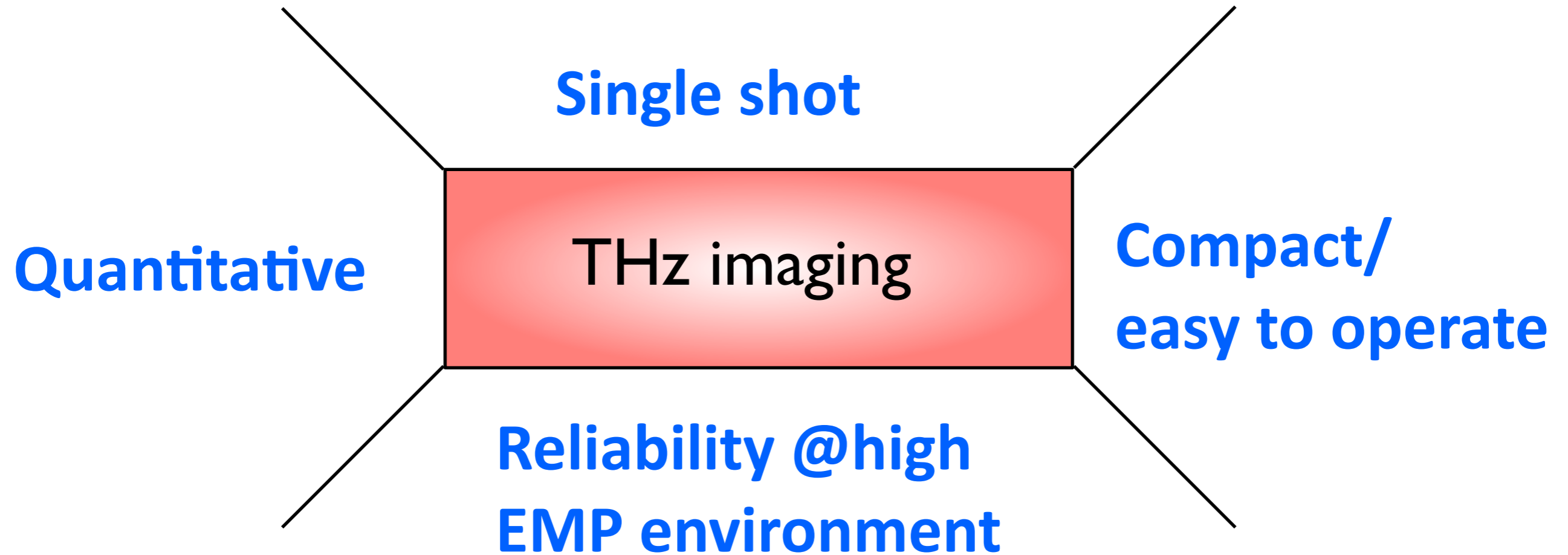
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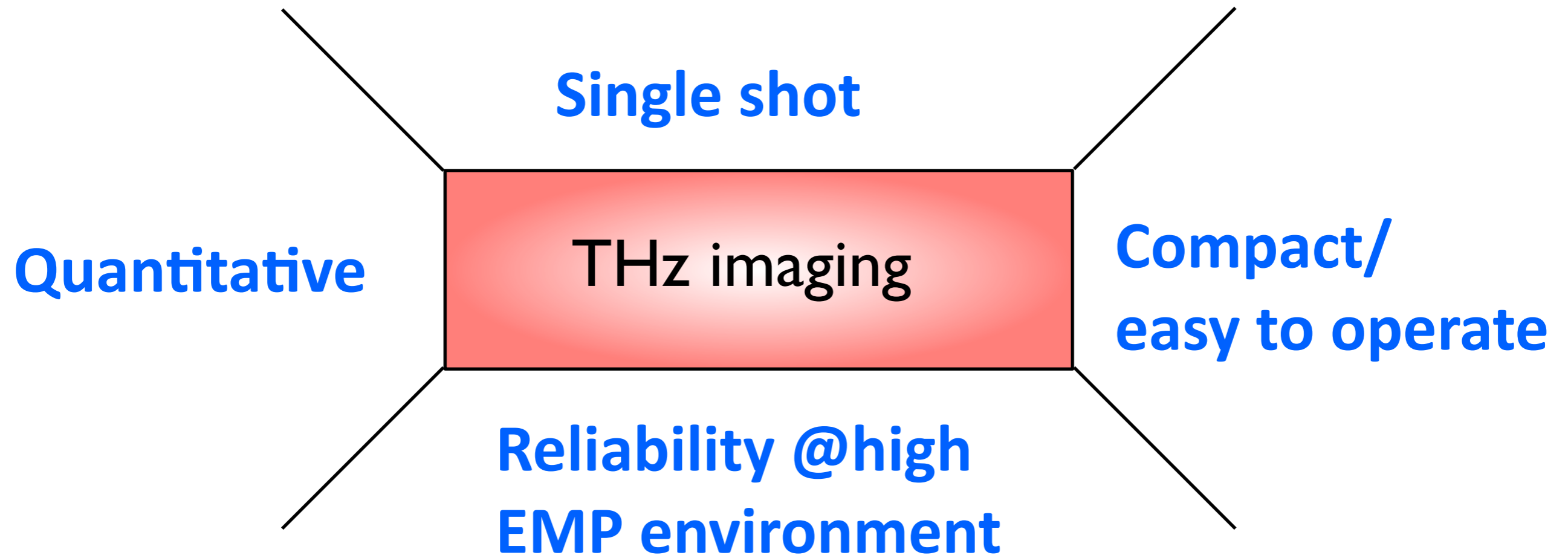
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# Visualization of wakefields @ AWAKE



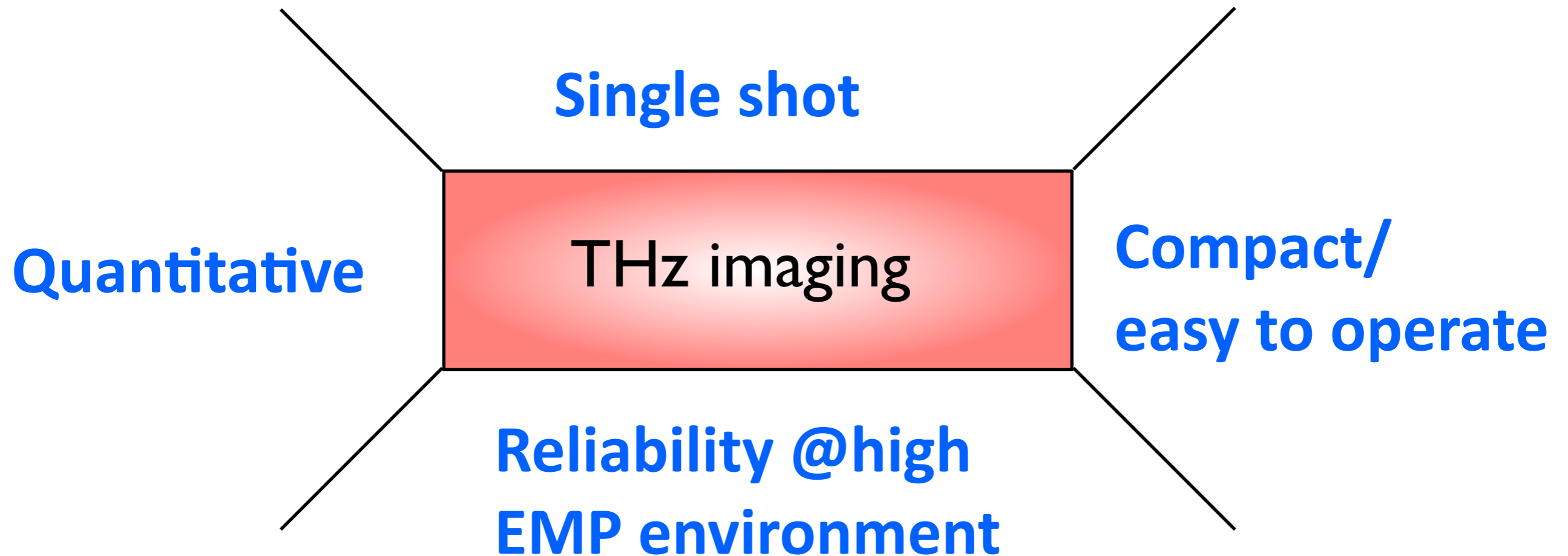


# Visualization of wakefields @ AWAKE



**Experiment** **Jena**

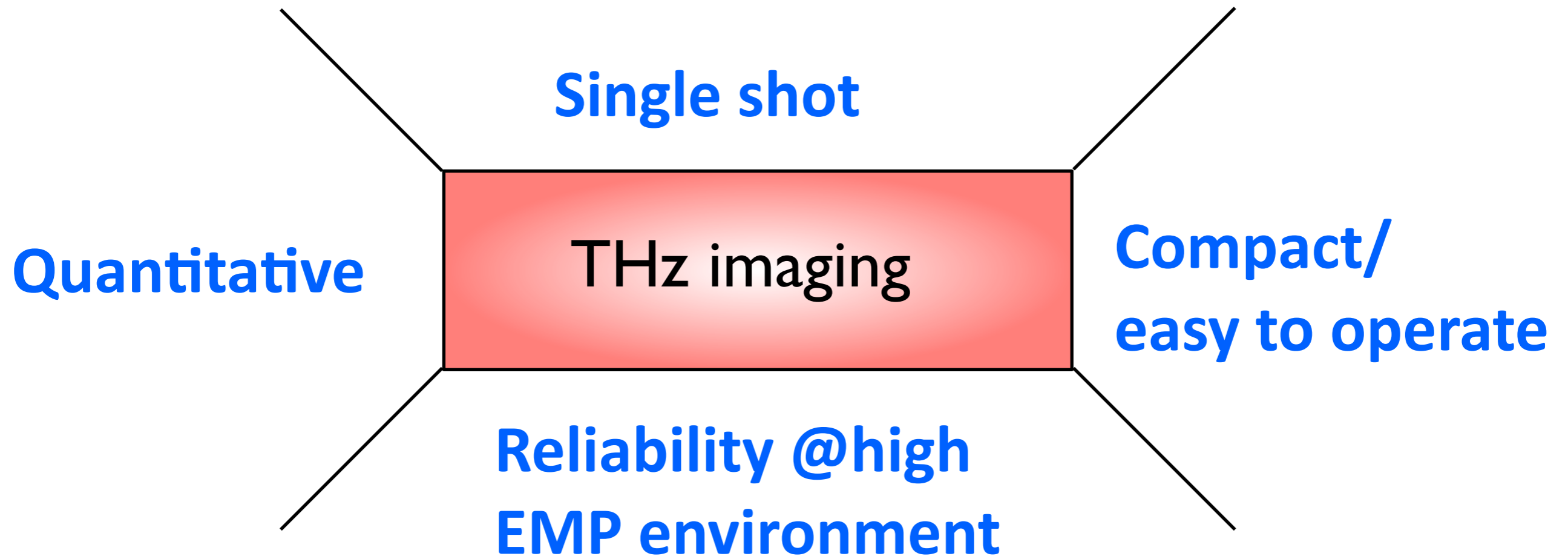
# Visualization of wakefields @ AWAKE



**Experiment** **Jena**

THz source, Plasma imaging diagnostics  
Development at Jena  
Implementation at CERN

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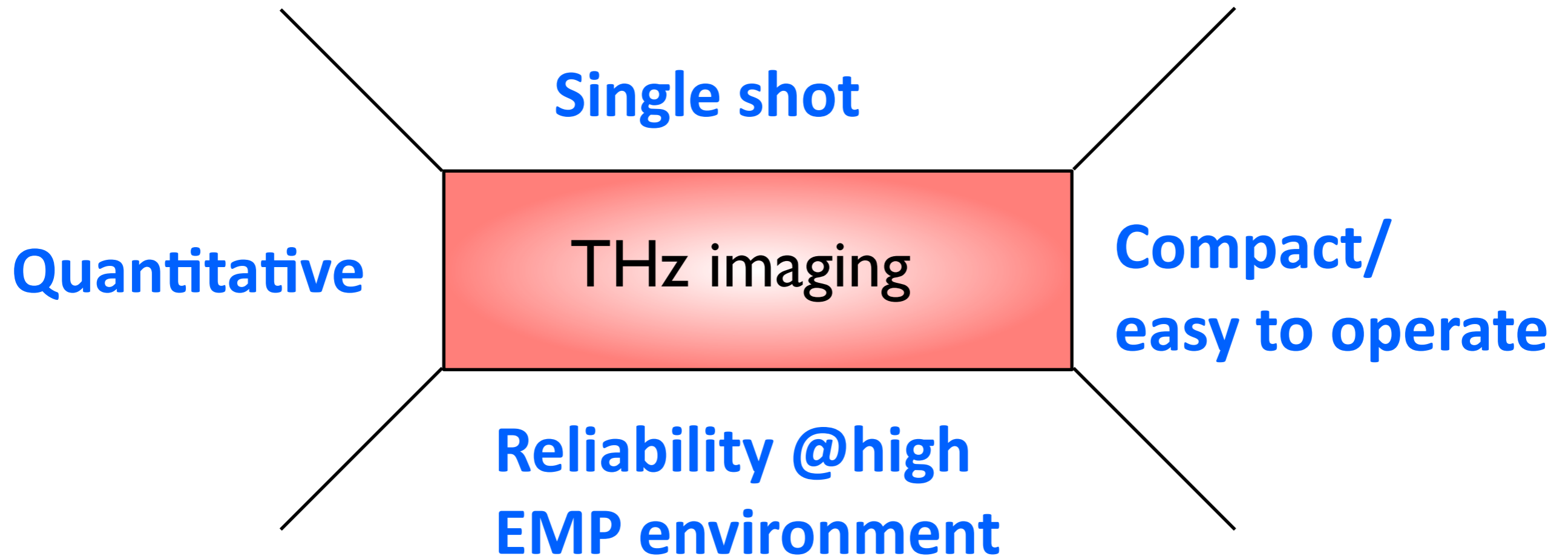


**Experiment** **Jena**

**Simulation/Software** **Düsseldorf**

THz source, Plasma imaging diagnostics  
Development at Jena  
Implementation at CERN

# Visualization of wakefields @ AWAKE



**Experiment** **Jena**

**Simulation/Software** **Düsseldorf**

THz source, Plasma imaging diagnostics  
Development at Jena  
Implementation at CERN

Software for extracting the phase and density  
information from THz images  
Comparison to 3D-PIC simulations

# Visualization of wakefields @ AWAKE

**Experiment** **Jena**

**Simulation/Software** **Düsseldorf**

## Outcome

- 1. Better understanding on the evolution of the wakefield**
- 2. Better control over electron injection and extraction**
- 3. Optimizing the acceleration process and design of next stage of the accelerator.**

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## Resources

**Experiment** **Jena**

1 Postdoc 1 PhD

**Simulation/Software** **Düsseldorf**

1 Phd