

# 2 A high-flux electron detection system to measure 3 non-linear Compton scattering at LUXE

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## 12 1 Introduction

- 13 • strong-field regime and overall goal
- 14 • former and current experimental landscape
- 15 • LUXE
- 16 • beam and laser conditions
- 17 • challenges (physics and detector)
- 18 • detector requirements (focus EDS)

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## 19    **2    The Electron Detection System**

### 20    **2.1    Screen Detector**

- 21        • scintillation effect
- 22        • gadox
- 23        • screen types
- 24        • cameras and optics
- 25        • expected operation at LUXE? (to compare with operation at FACET-II)
- 26        • ...

### 27    **2.2    Straw Detector**

- 28        • Mechanical developments: Paraffin straw, ARES, E320
- 29        • Cherenkov effect
- 30        • straw principle
- 31        • sipm performance
- 32        • led calibration
- 33        • ...

## 34    **3    Detector Tests**

### 35    **3.1    ARES**

- 36        • facility
- 37        • goals and requirements (i.e. why ares?)
- 38        • observables for straws and screen
- 39        • ARES data: signal features, angle scan, screen tests, beam profile scan, direct hits & other
- 40            problems
- 41        • results and conclusions
- 42        • why going to facet
- 43        • ...

## 44 **3.2 FACET-II with E-320**

- 45 • requirements
- 46 • E320 data: commissioning?, y scan calibration, radiation damage, dipole scan screen, laser
- 47 energy scans
- 48 • this was reportet in the VCI proceeding [1]

## 49 **4 Conclusion**

### 50 **Acknowledgments**

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### 55 **Conflict of Interest**

56 The authors have no conflicts of interest to disclose.

### 57 **Author Contributions**

### 58 **Data Availability**

59 The data and analysis that support the findings of this study are openly available in a Github  
60 repository [].

### 61 **References**

- 62 [1] A. Athanassiadis et al., *A high-flux electron detector system to measure non-linear Compton scattering*  
63 *at LUXE, Nucl. Instrum. Meth. A* **1080** (2025) 170777 [2505.14720].