

Pickup Design for High Resolution Bunch Arrival time Monitor for FLASH and XFEL*



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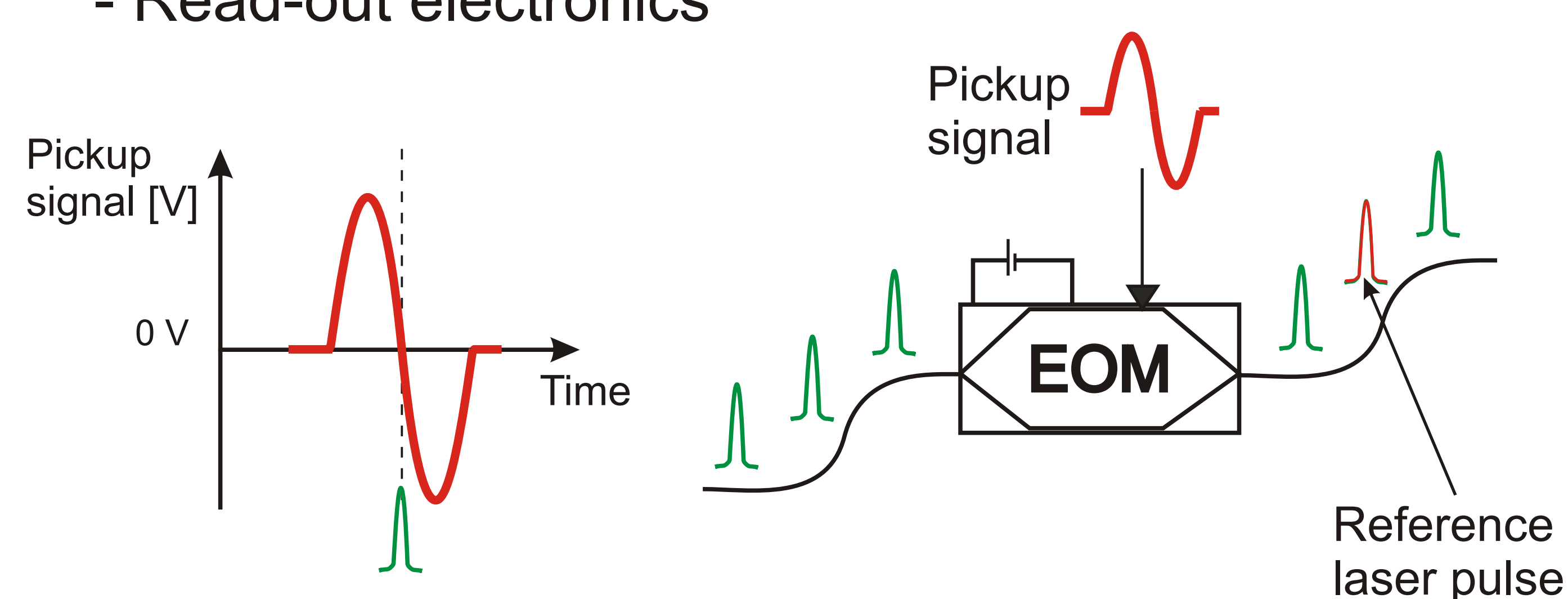
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Motivation

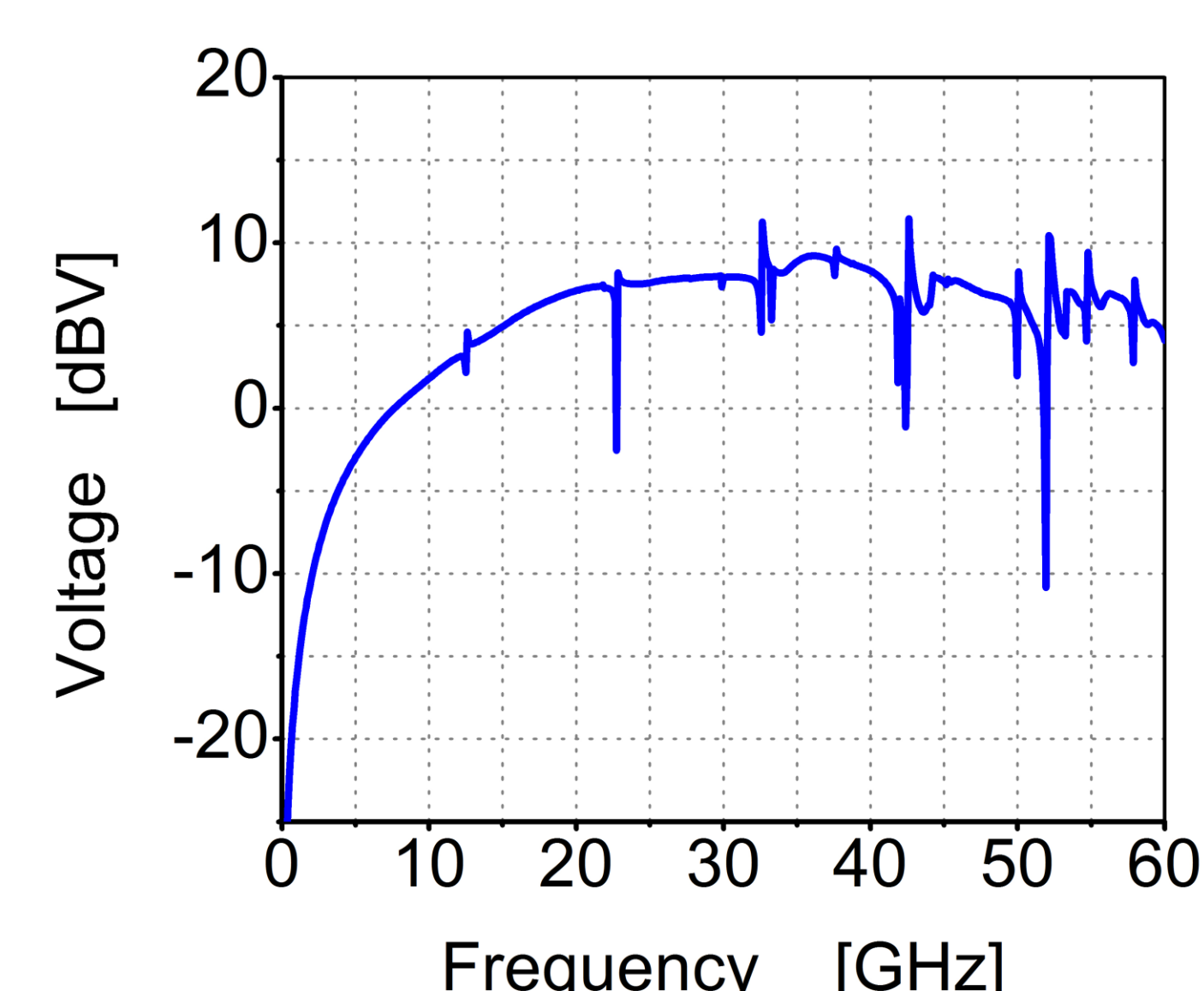
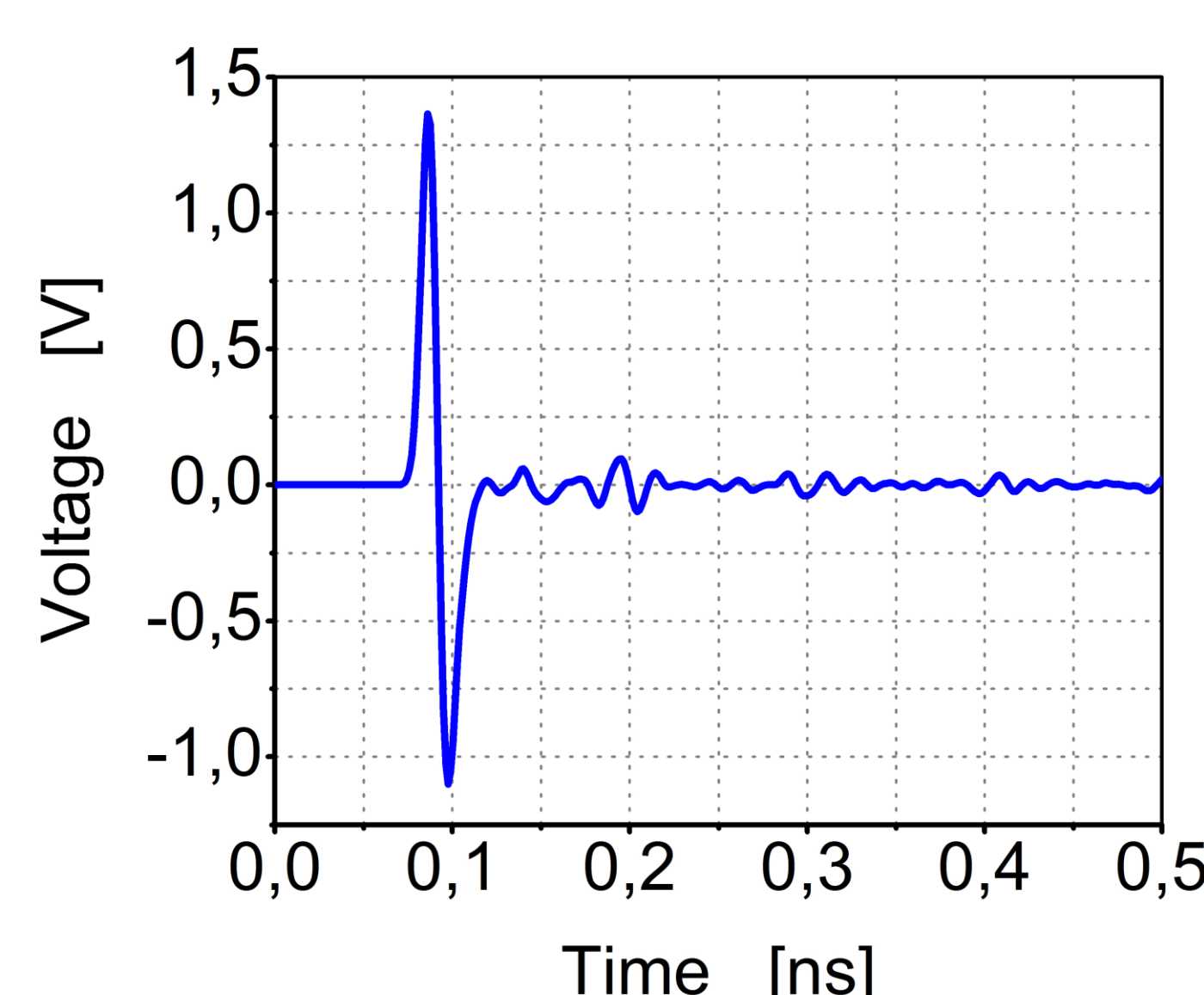
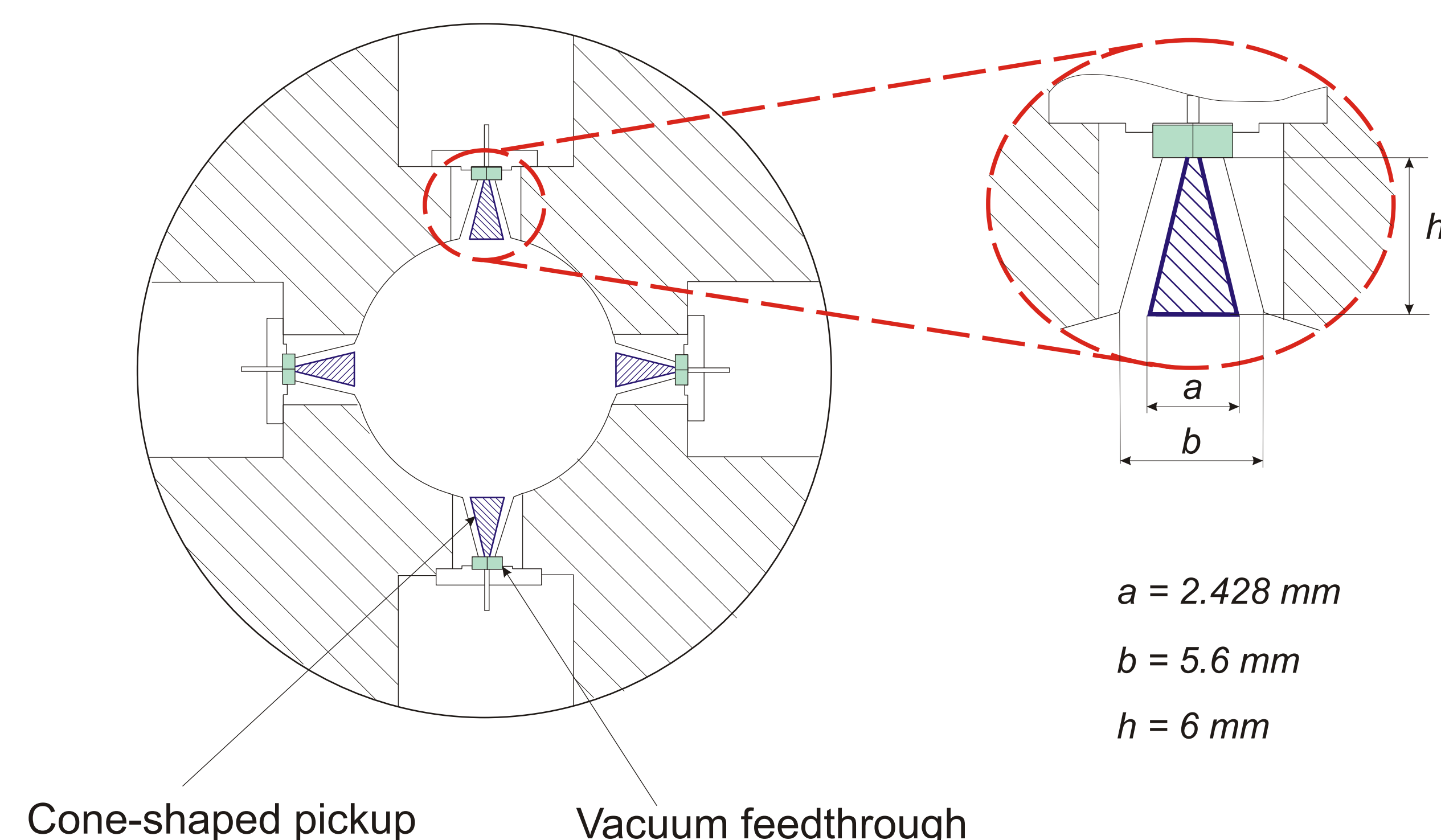
- The current system:
 - bunch charges of 200 pC up to more than 1 nC
 - pickup bandwidth of 10 GHz
- The voltage response of the pickup depends from the bunch profile and the bandwidth of the pickup
- In order to satisfy the resolution requirements for ultra short and low charged bunches, the bandwidth of the RF-pickup needs to be extended up to 40 GHz

Introduction

- A Bunch Arrival time Monitor (BAM) comprises:
 - RF-pickup
 - Electro-optical front-end
 - Read-out electronics

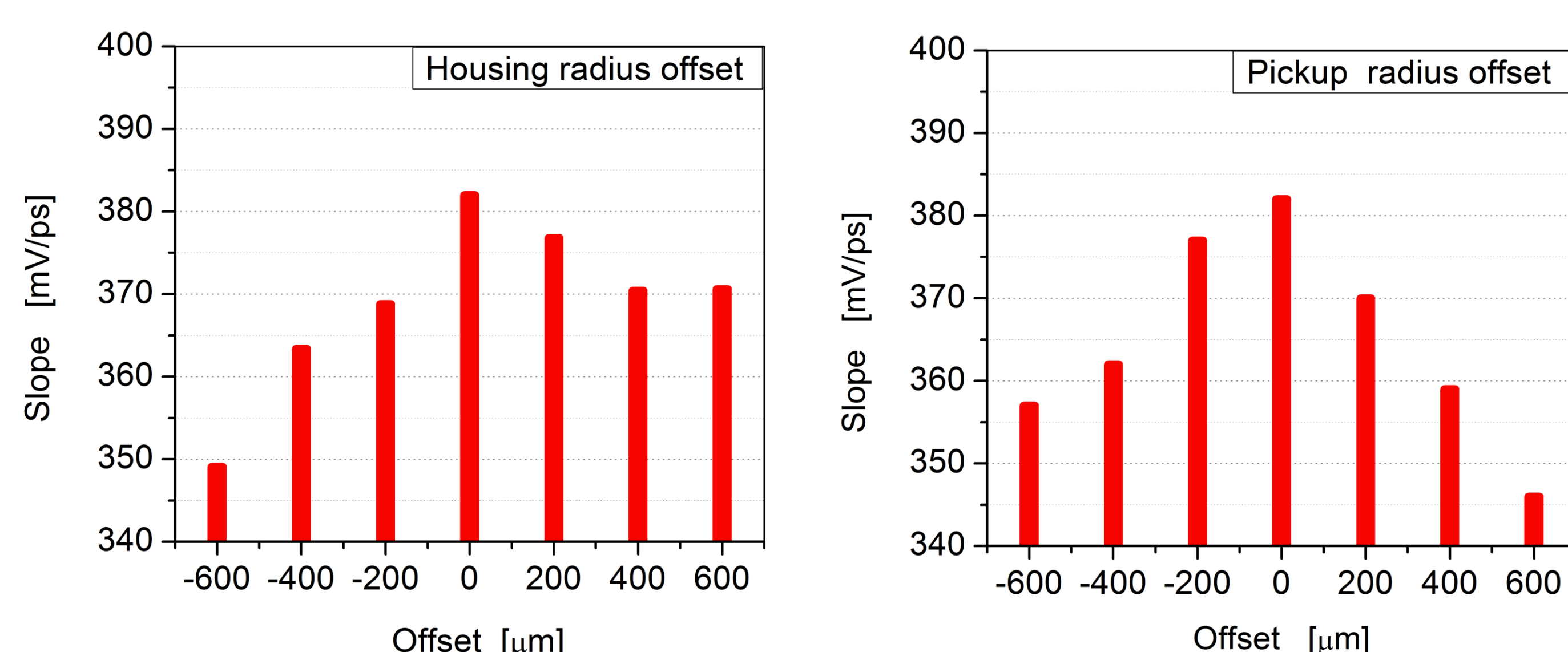


Cone-shaped pickup design



- The slope at the zero crossing is 382 mV/ps
- Bandwidth up to 40 GHz

Tolerance analysis



- The decrease of the slope steepness due to the variations of the dimensions in the range of $\pm 600 \mu\text{m}$ is less than 8%
- Steepest slope for the nominal value

Conclusion

Cone-shaped pickup with:

- Bandwidth up to 40 GHz
- Slope steepness at the zero crossing of 382 mV/ps
- Ringing decay to less than 1% from the peak amplitude after 0.5 ns

Project partners



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*The project is supported by German Federal Ministry of Education and Research (BMBF) within Joint Project - FSP 301. Also, A. Kuhl and S. Schnepf are also supported by the 'Initiative for Excellence of the German Federal and State' Governments and the Graduate School of Computational Engineering at Technische Universität Darmstadt