

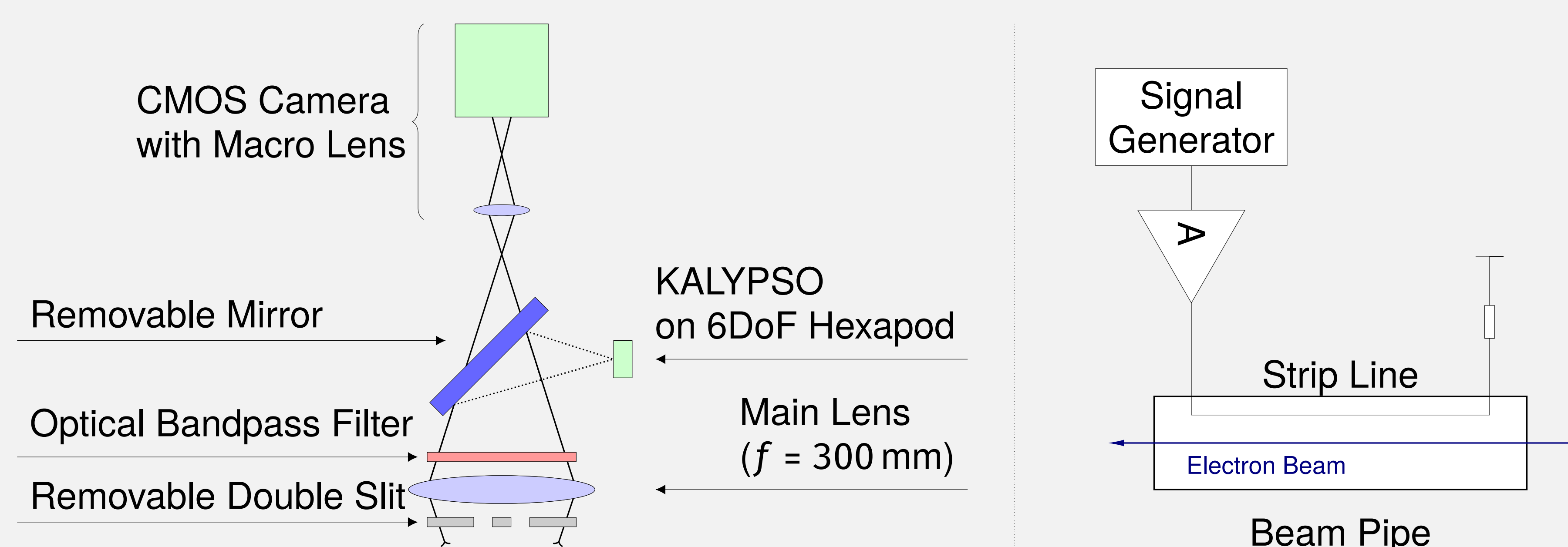
Time-Resolved Measurements of Transverse Beam Excitation in an Electron Storage Ring

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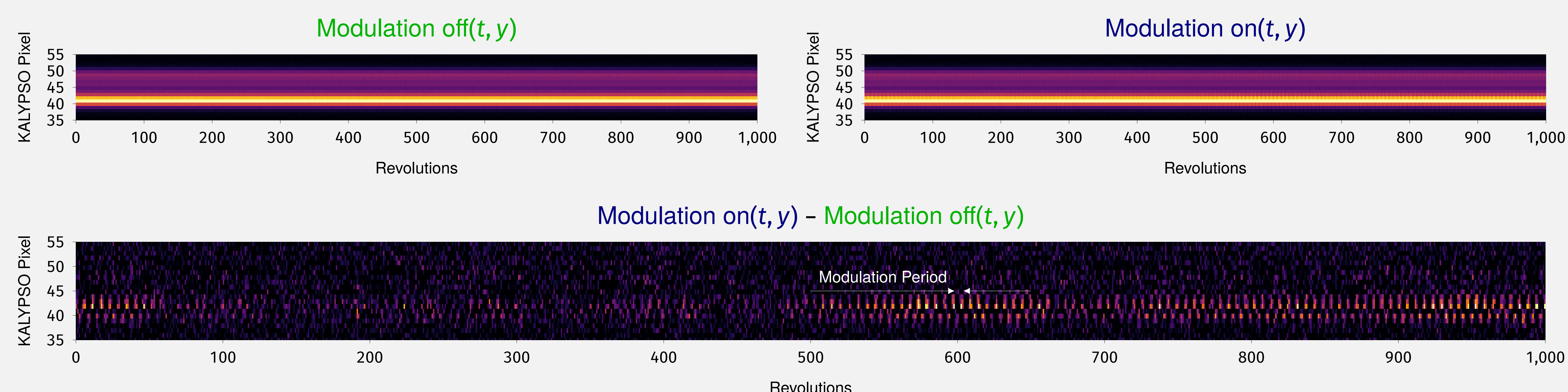
Motivation

- Transverse modulation can increase beam size, thus reducing intra-beam scattering
- KARA vertical beam size too small for crotch absorber set diffraction limit
- Use double slit setup to convert size changes to contrast modulation^[1]
- Sample these changes with fast (turn-by-turn) line camera KALYPSO^[2] to distinguish mere *position* modulation from desired *size* blow-up

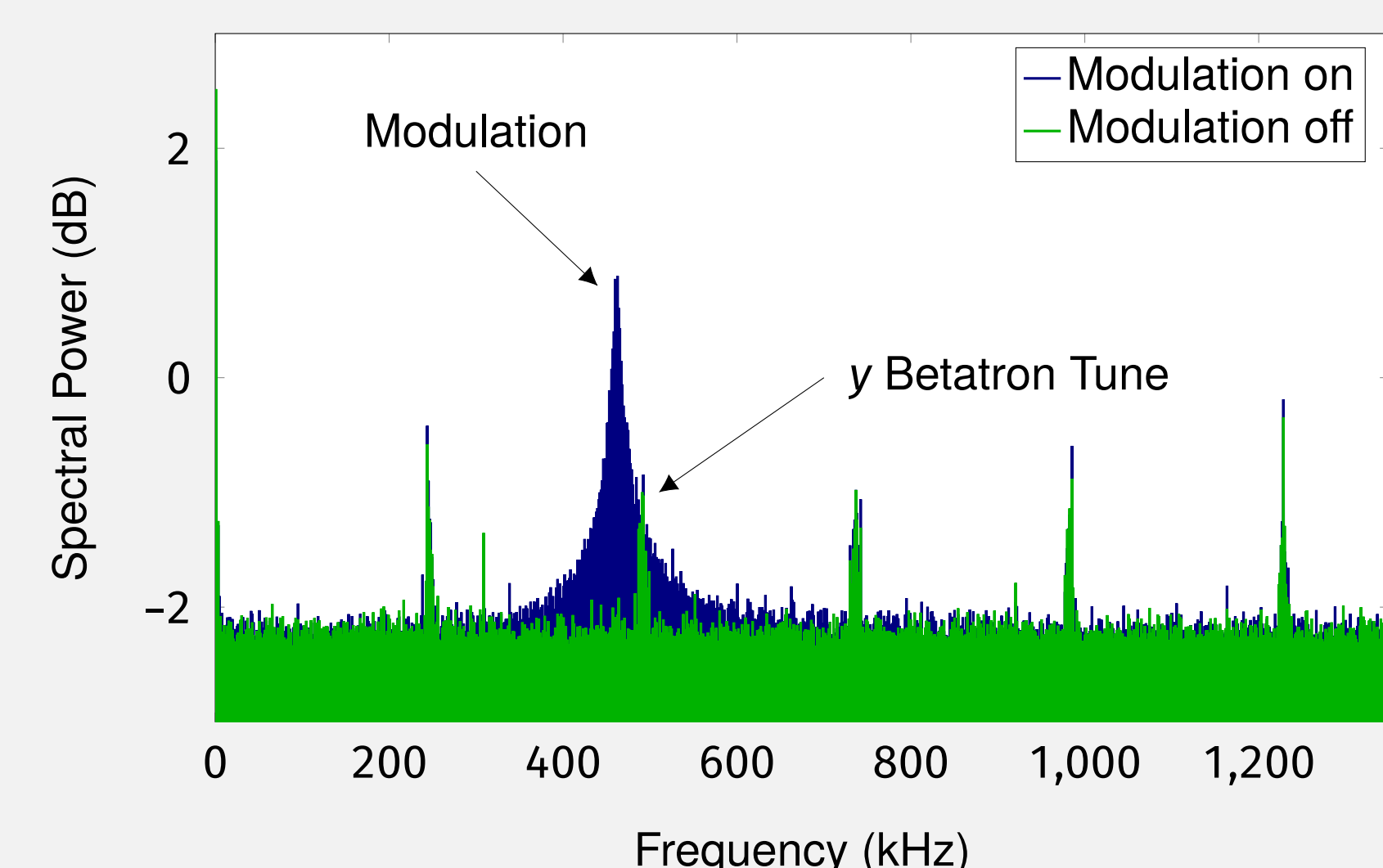
Measurement and Excitation Setup at KARA



Vertical Profile Measurements with/without Excitation(Sine, 11 W, 460 kHz), No Double Slit



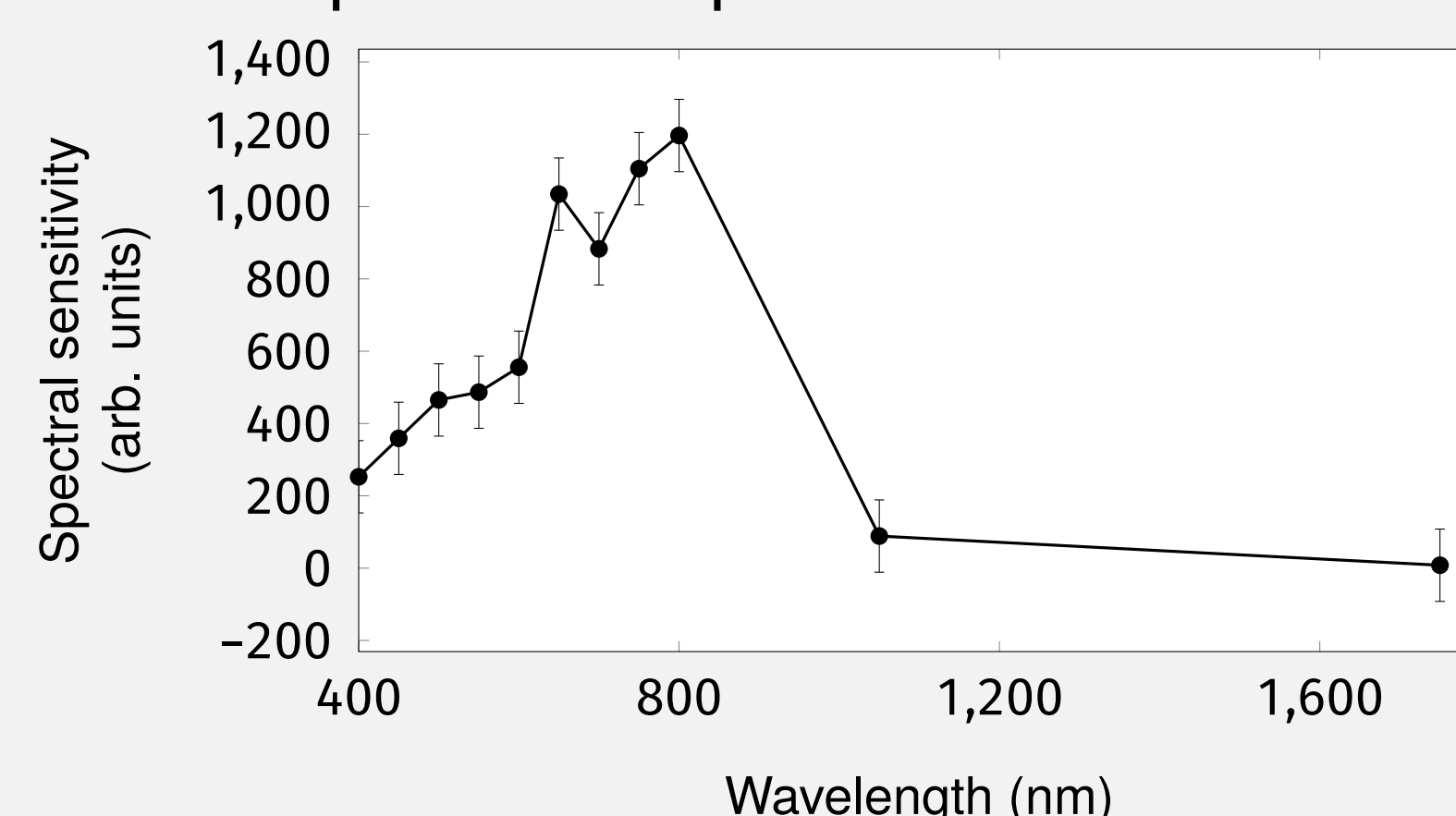
Spectral Analysis



- Calculate Periodograms of Pixel no. 40
- Modulation and betatron tune detectable

Planned Optimizations

- Optimizing double slit geometry
- Calibrate KALYPSO to absolute units
- Spectral response used to match double slit and optical bandpass filter



Summary and Outlook

- Detector and Modulation setup successfully commissioned
- First test show working modulation scheme but double slit measurements not possible due to (radiation-) damaged optics



- Mirror and windows need to be replaced

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- [3] M. Patil et al., "Application of KALYPSO as a diagnostic tool for beam and spectral analysis", doi: 10.18429/JACoW-IPAC2021-WEPAB331

Acknowledgments

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Conference

