



Non-Uniform Integration of TDCI Captures

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TDCI

Time Domain Continuous Imaging

- Capture a per-sensel waveform of incident light
- Only store over-threshold changes to limit datarate
- Computationally integrate the waveform to create exposures

Non-Uniform Integration

- Non-Uniform in space: Different exposures for different parts of the frame
- Non-Uniform in time: Different gain at different times in the exposure
- Gains can be *functions*, *negative* and/or *discontinuous*

Like a magic programmable ideal LCD focal-plane shutter

Gain Example

Figure: Selected Source Frames



Figure: Two-Sided Gain Function

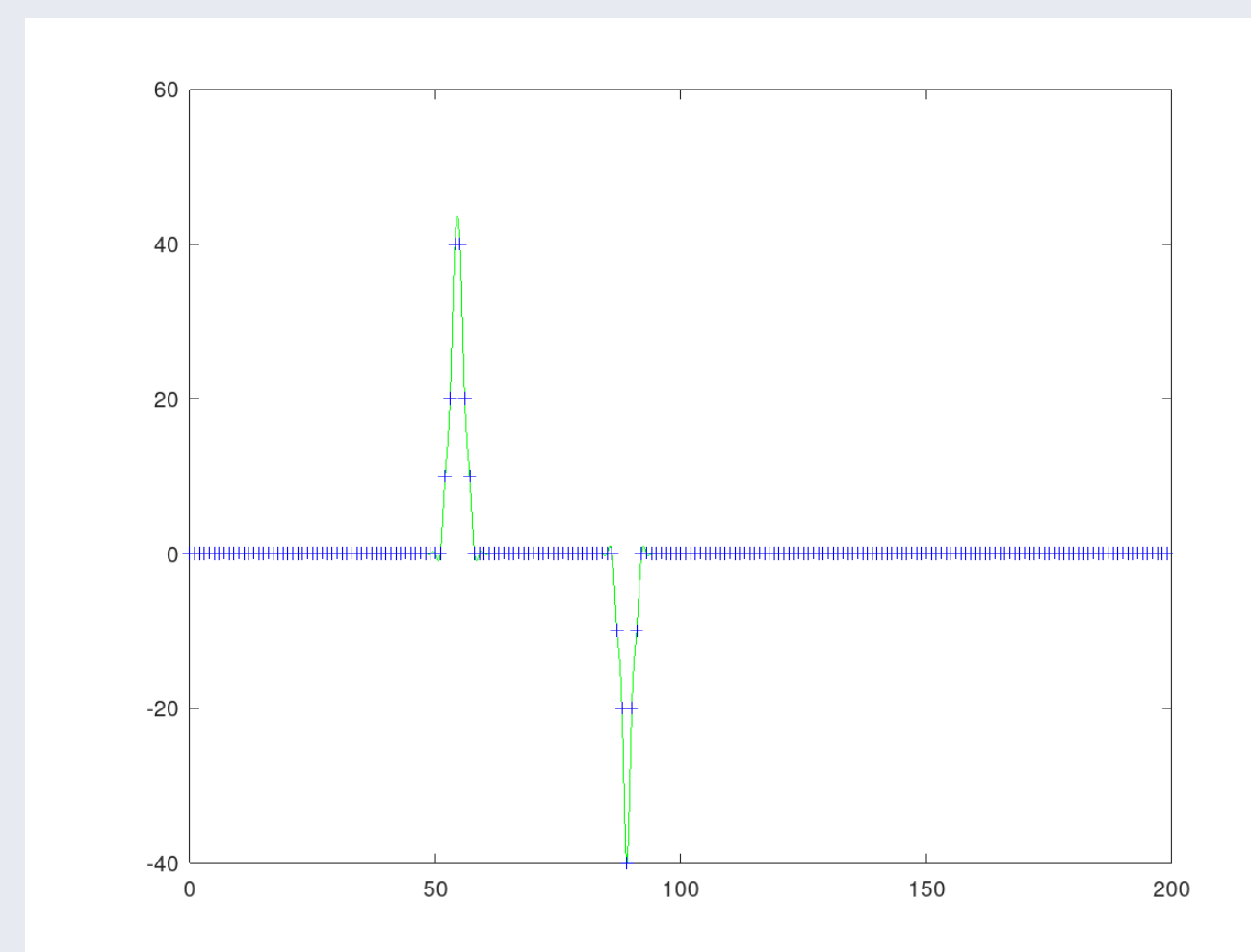


Figure: Rendered Difference Exposure



Multi-Region Example

Figure: Area Mask

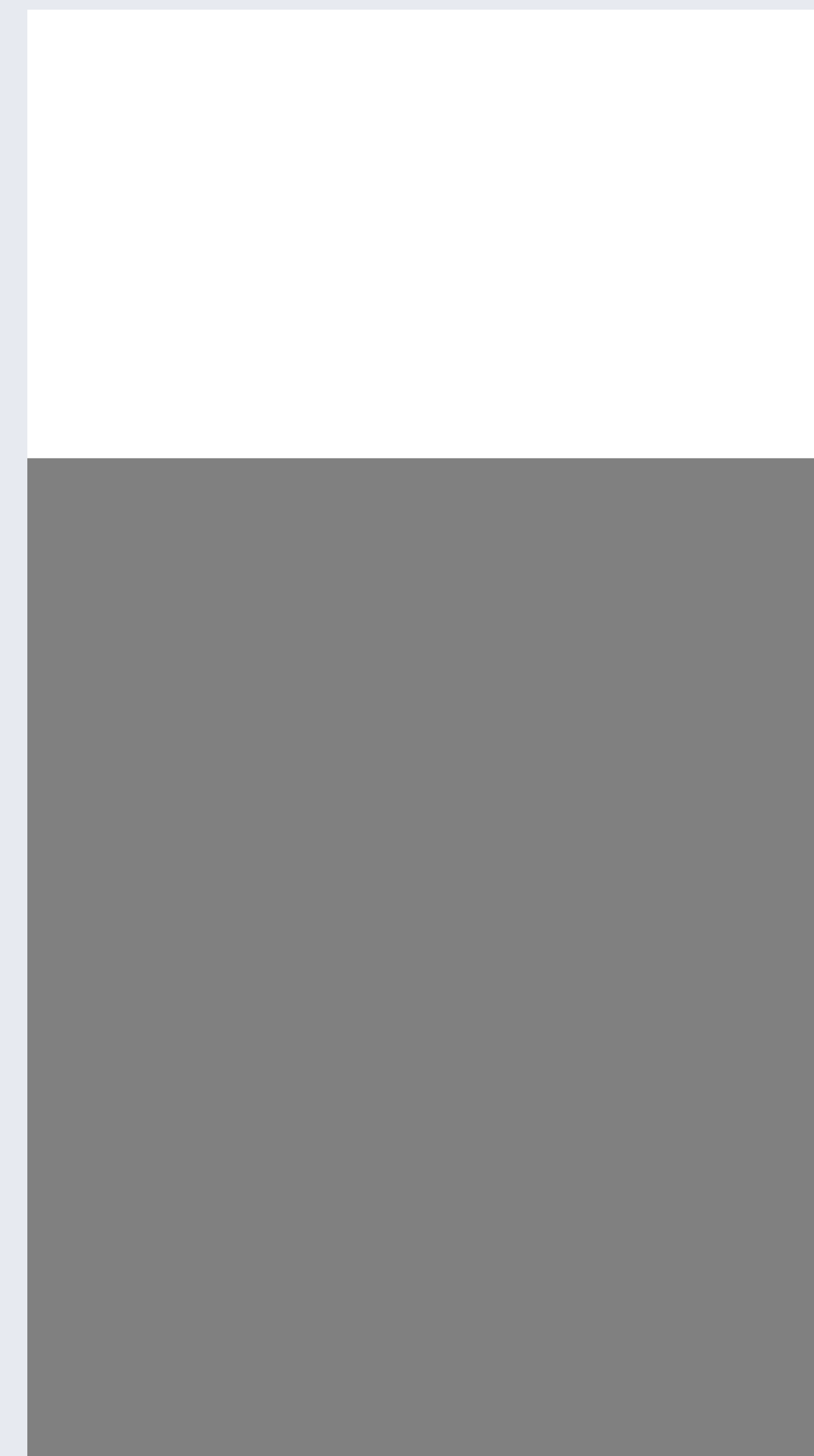


Figure: Resulting Exposure

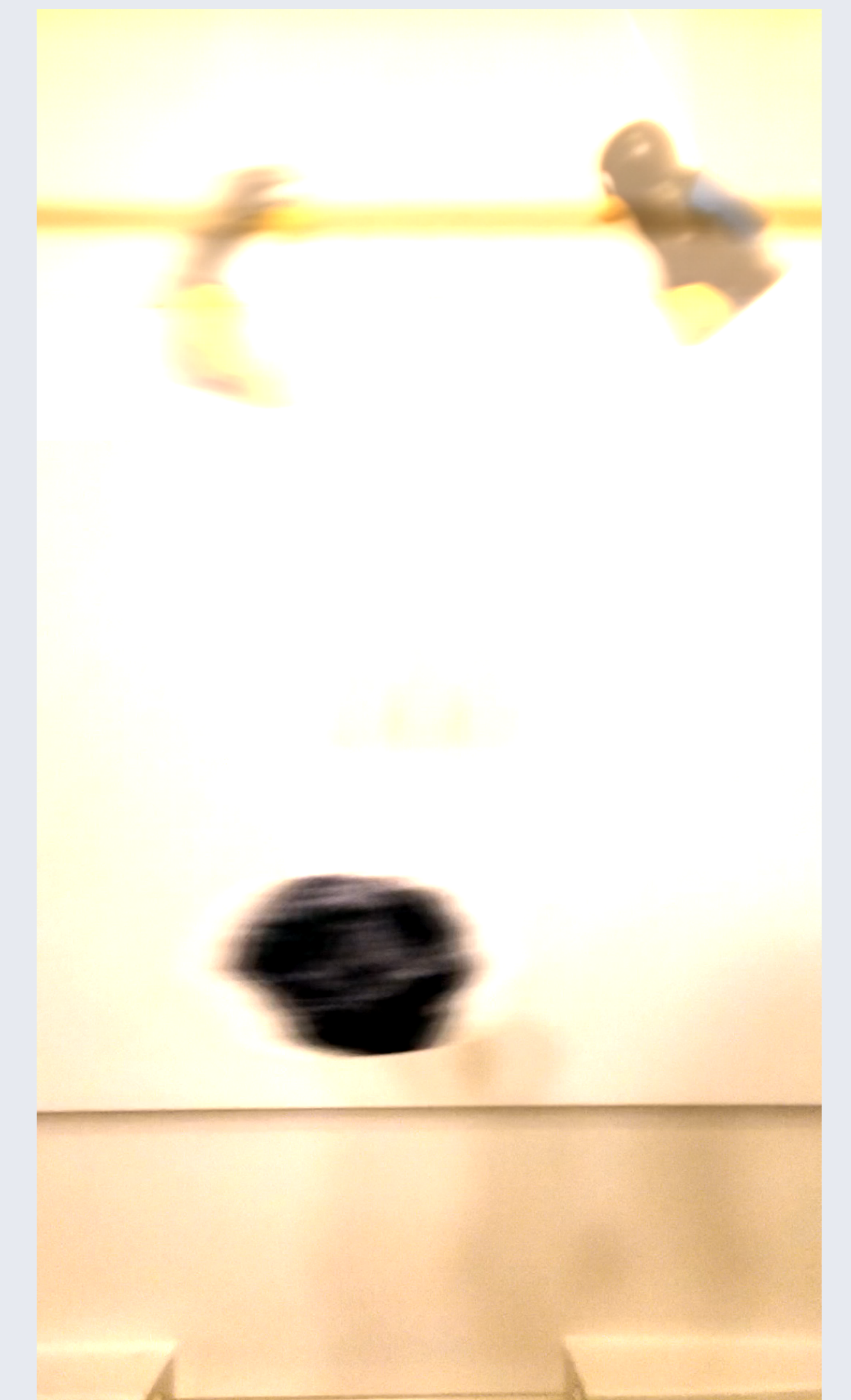


Figure: First Gain Function

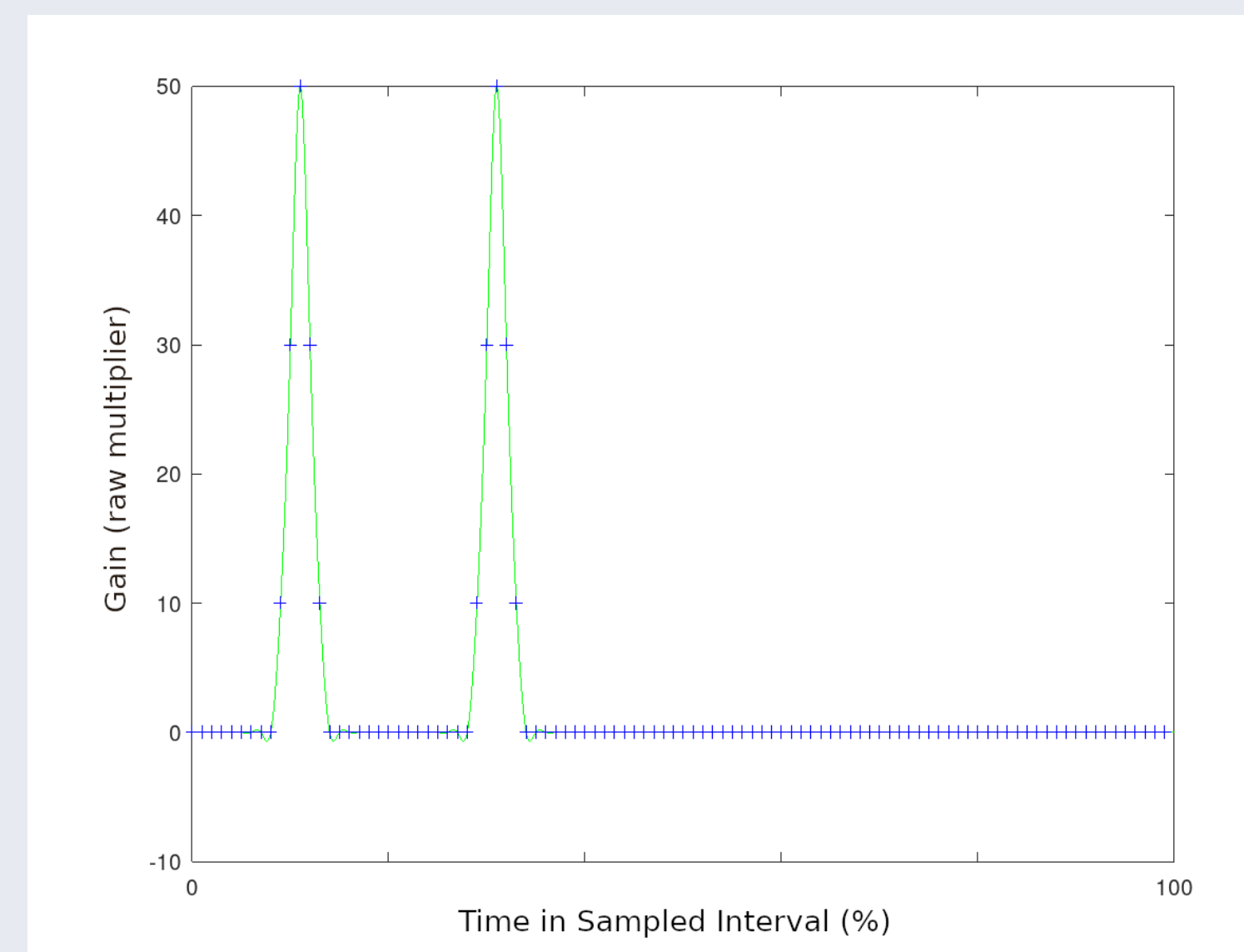
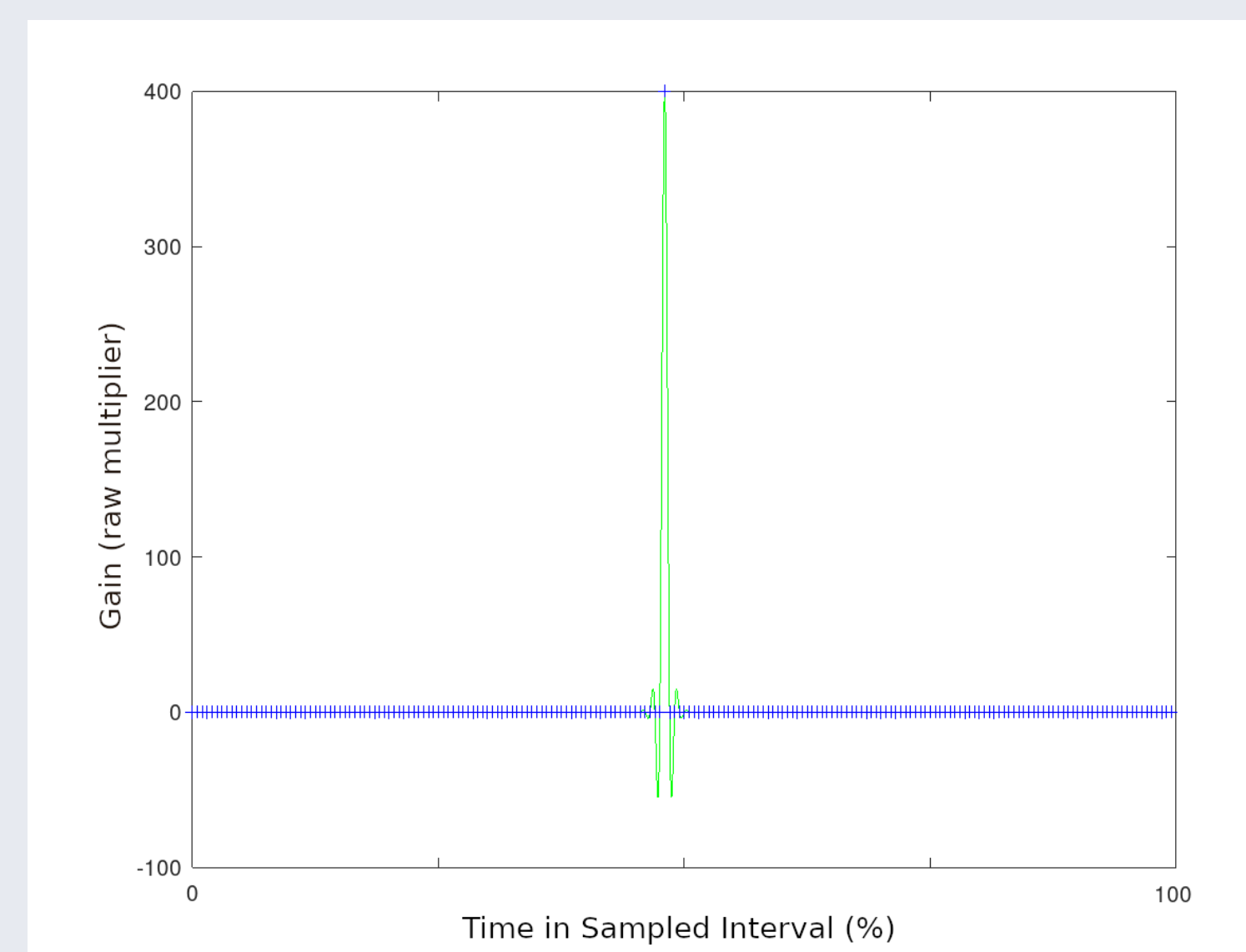


Figure: Second Gain Function



Implementation

- Functions specified as lists of control points
- Masks specified as P5 PGM images, one gray value per region
- Key each function with a gray from the mask
- Interpolate over the control points for gain at given time

Applications

- Static-feature elimination
- Time-lapse/stroboscopic/motion study alternative
- Artistic multiple-exposures
- Still unknown: This is a new ability