Crosstalk Measurement in AGH Krakow

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- It would be a good idea to have the same equipment within different labs
- The expensive devices can do much more than we need
- We can make a cheap device which will solve 95% of our problems

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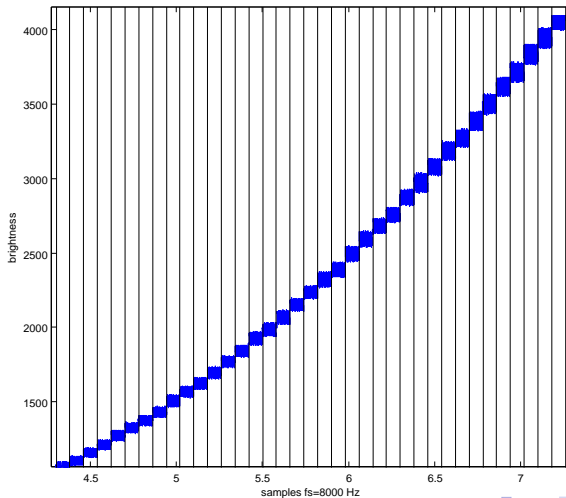- Upload to a PC (RS232 converted to USB interface)
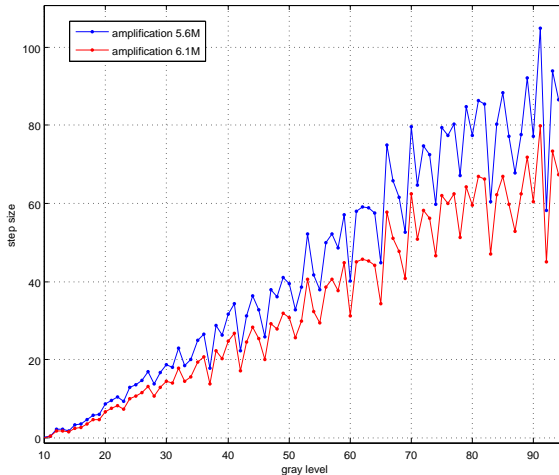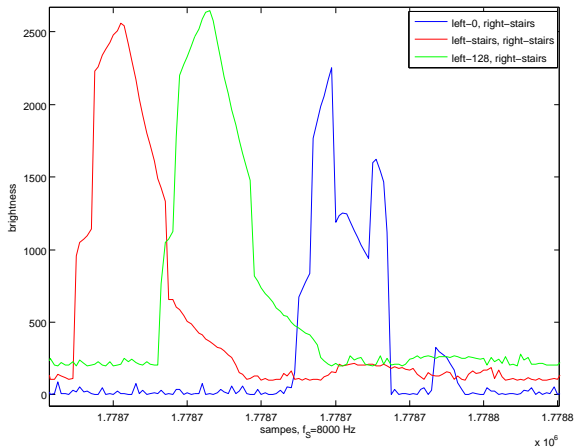- The output is 12 bits

The Interface
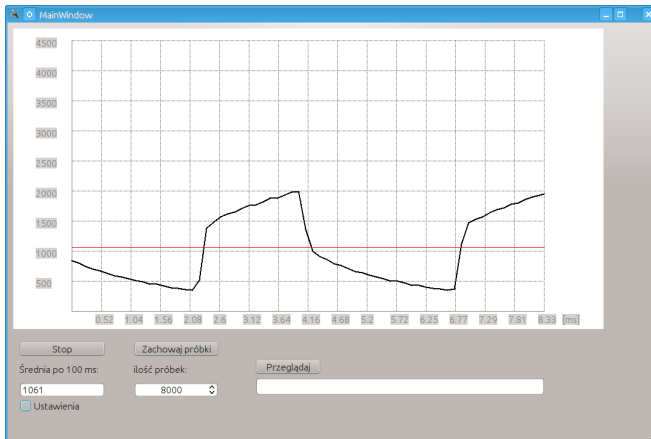
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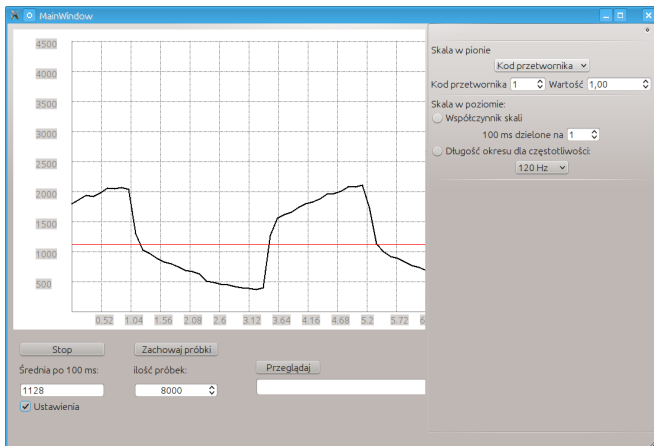
Synchronization

Similarity for Different Amplification
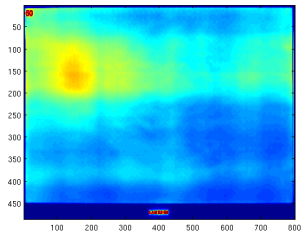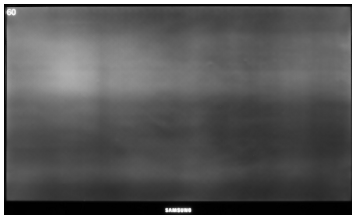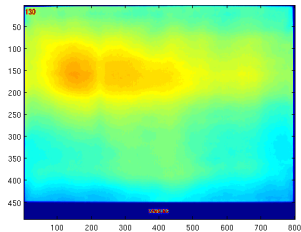
Detail View

Our Equipment

- Polarization Display: Hyundai W240S
- Shutter Glasses 3DTV: SAMSUNG UE40C8000 + SAMSUNG SSG-2200AR
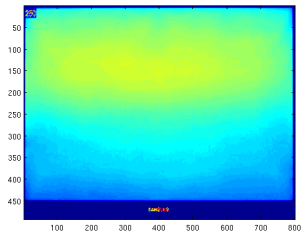
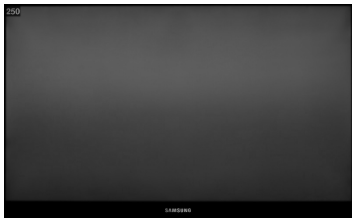The results are obtained for Samsung TV set.

Samsung Characteristic
Space Crosstalk Change

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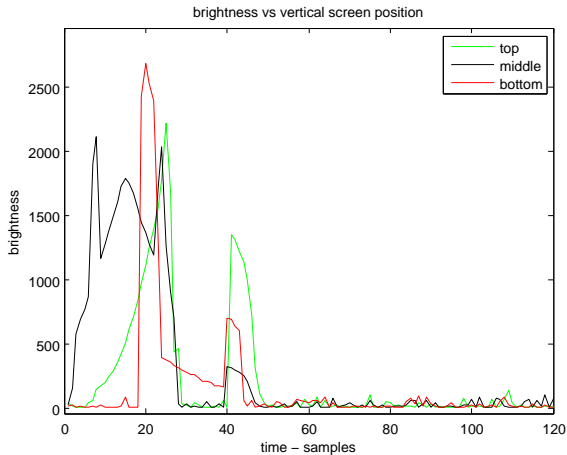# Samsung Characteristic
Space Crosstalk Change

Samsung Characteristic
Space Luminance Change
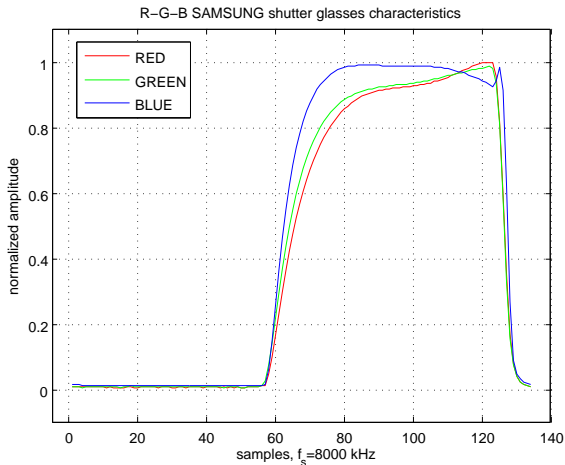

brightness vs vertical screen position

Samsung Characteristic
Shutter Glasses' Characteristics

R-G-B SAMSUNG shutter glasses characteristics

Conclusions

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- Luminance measurement through right or left glass can give different results
- The distance and angle influence obtained results
- The crosstalk links both views values i.e. measuring through left glass we have to take into consideration the right view luminance

Luminance Function

$$l(x, y, g, l_l, l_r, d, \alpha, s, D)$$

- x, y are the coordinates of the point which is central to the measurement device
- g indicates through which glass we are looking, r for right and l for left
- l_l is the value which was set to the x, y pixel of the left view in the sequence. l_r similarly is the value for the right view
- d is the distance to the screen
- α is the angle of view
- s software used to play
- D display model, maybe even a particular unit

Luminance Function Modification

$$l(g, l_l, l_r)$$

Let us fix all other variables.

If we normalize the value of $l(\cdot)$ to 0, 255 we can very intuitively define crosstalk as

$$C_r = \frac{l_r - l(g = r, l_l, l_r)}{l_r}$$

where C_r is a crosstalk for the right view.

Such definition says that crosstalk is the difference between the value which we wish to display and the value seen by a viewer.

Reasons to have crosstalk

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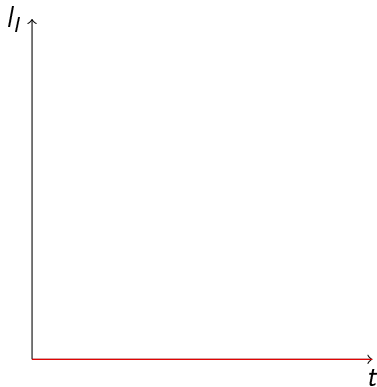- Glasses and display incorrect synchronization
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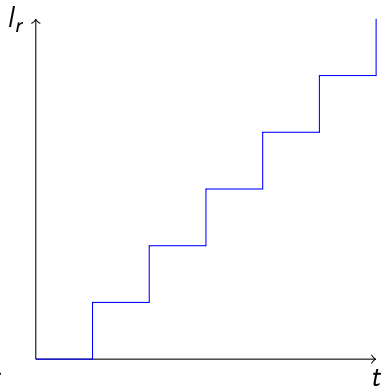- Crosstalk cancellation or other active function(s)

The Sequence

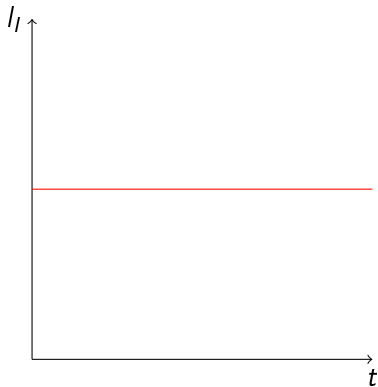We measure through the right glass.
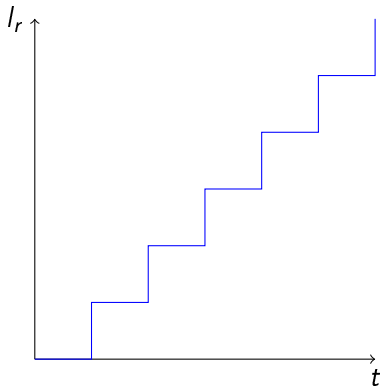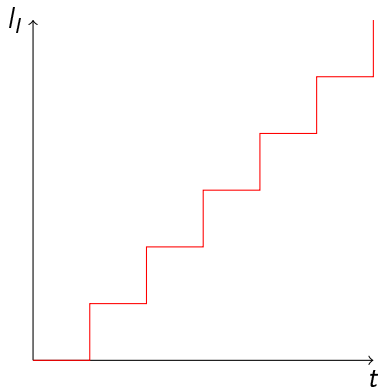
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Right sequence

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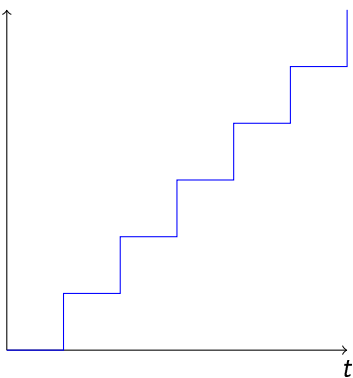
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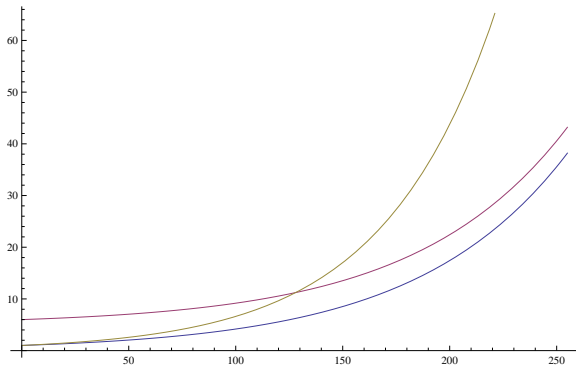
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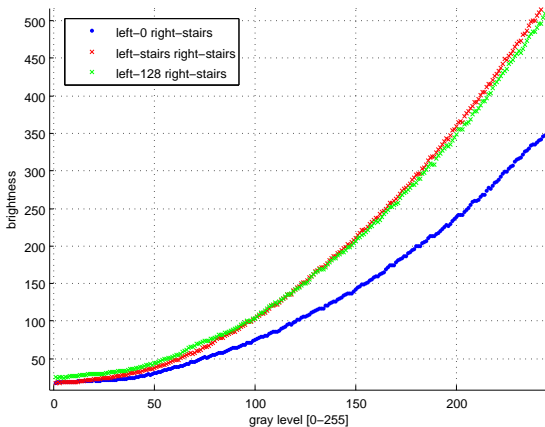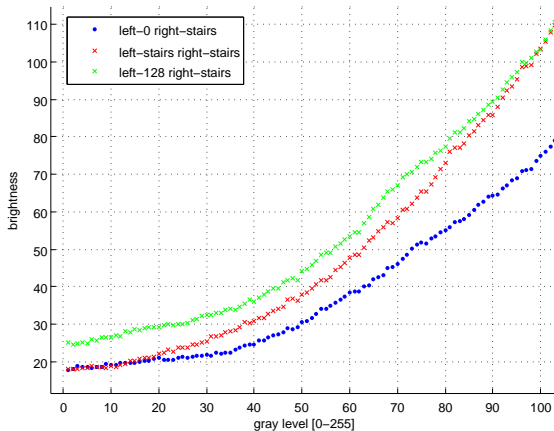Left sequence

Right sequence

Theory

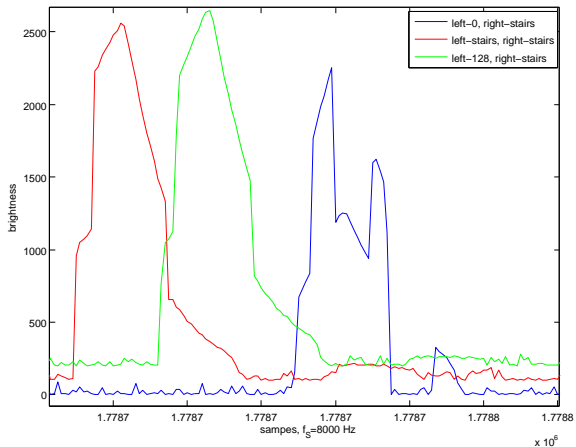Let us assume that glasses and glasses-tv set synchronization is the main reason of crosstalk

The Obtained Result

The Obtained Result Zoom

Time Change

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- It seems that the most important crosstalk reason is active crosstalk "compensation"

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- Can we think about other crosstalk definition?
- At least on our TV set we have large differences in the crosstalk luminance depending on the pixel coordinates
- It seems that the most important crosstalk reason is active crosstalk "compensation"
- The final crosstalk value(s) should be strongly simplified