

Aerogel: Refractive Index, Height, and Humidity

7/18/2013

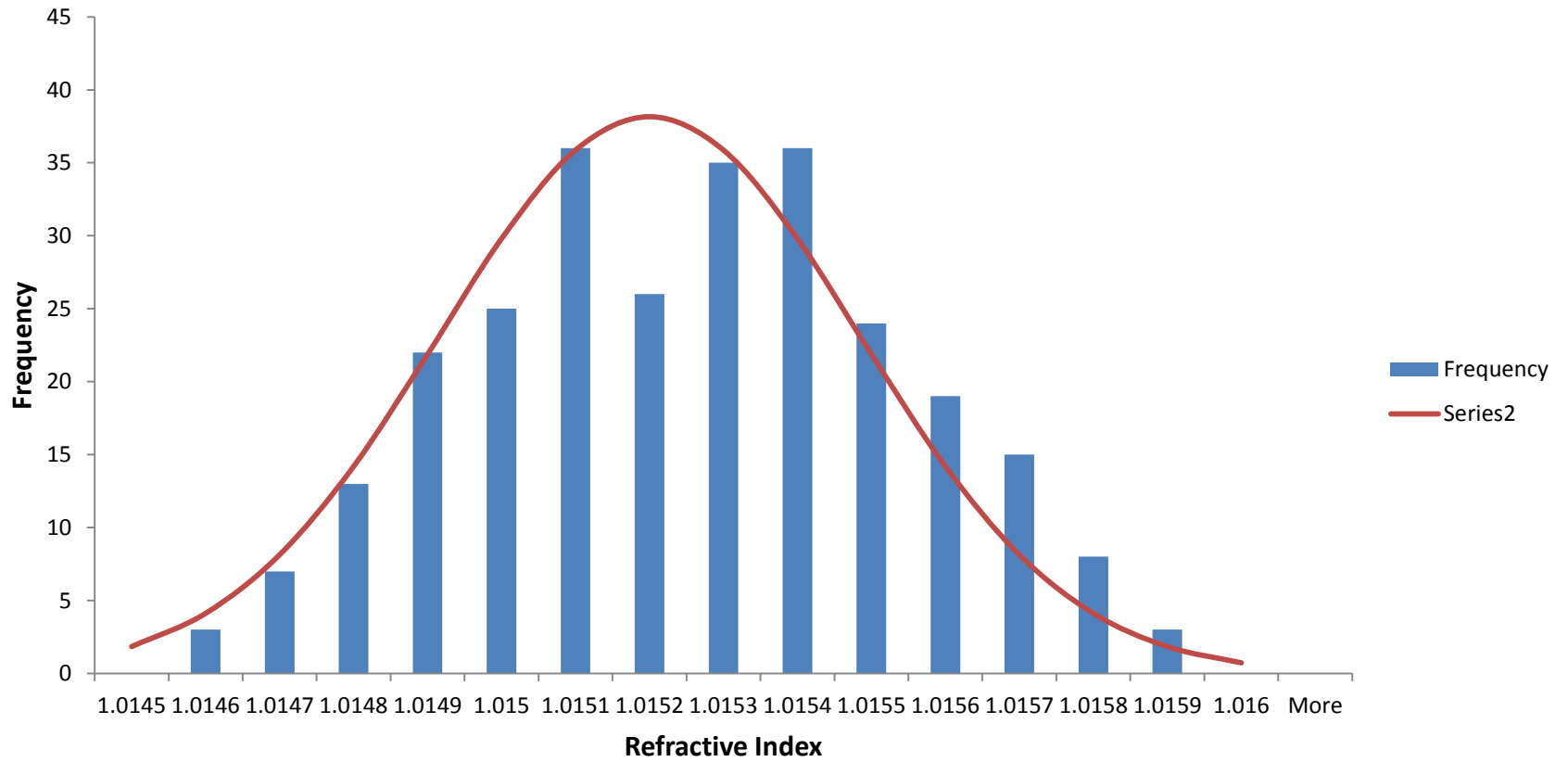


Refractive Index

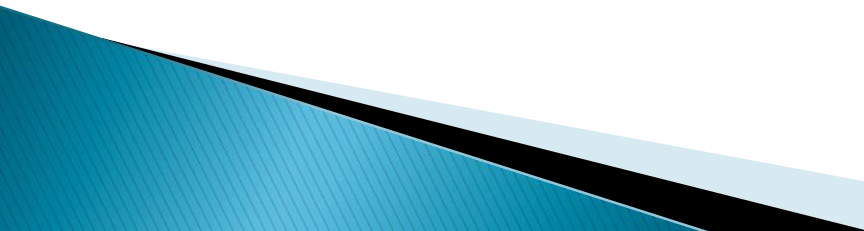
- ▶ We re-measured 4 tiles that had been previously measured by Jullianna and Nathaniel

Before	After	Difference
1.015	1.0149	1E-04
1.0148	1.0148	0
1.0149	1.0152	0.0003
1.0154	1.0148	0.0006
1.0149	1.015	1E-04
1.0148	1.0149	1E-04
1.0154	1.0151	0.0003
1.0154	1.0155	1E-04

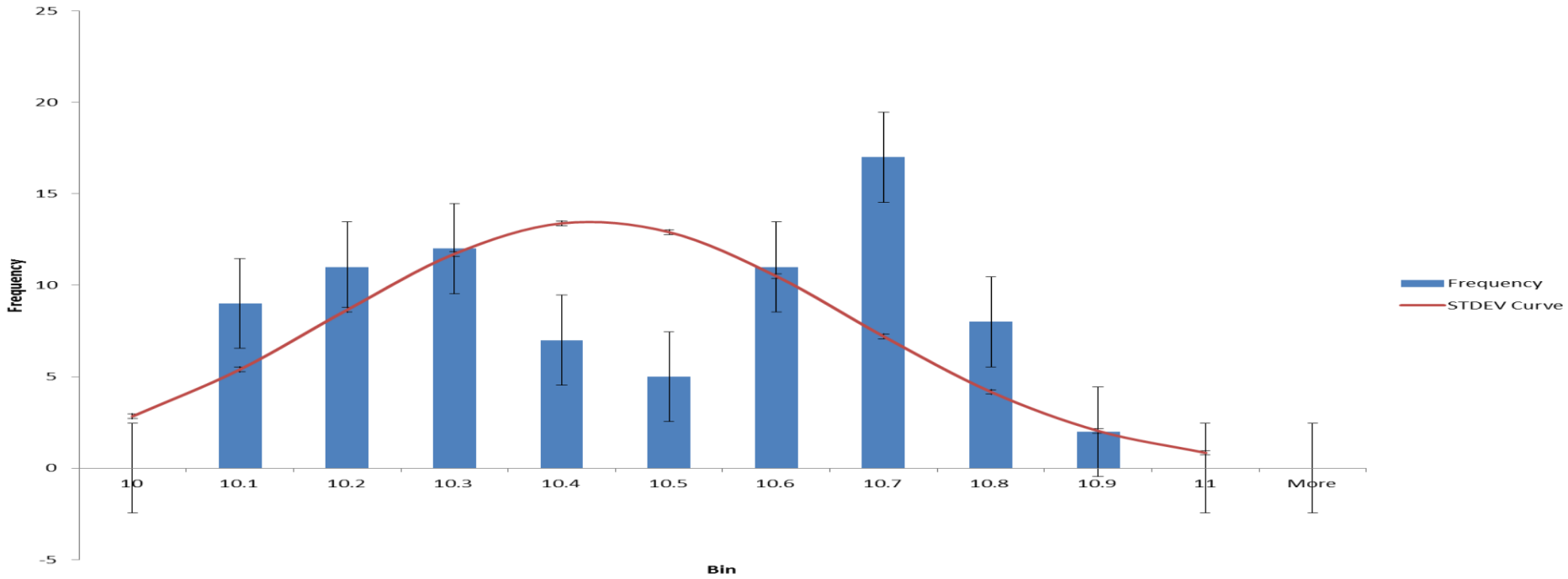
Refractive Index 1.015



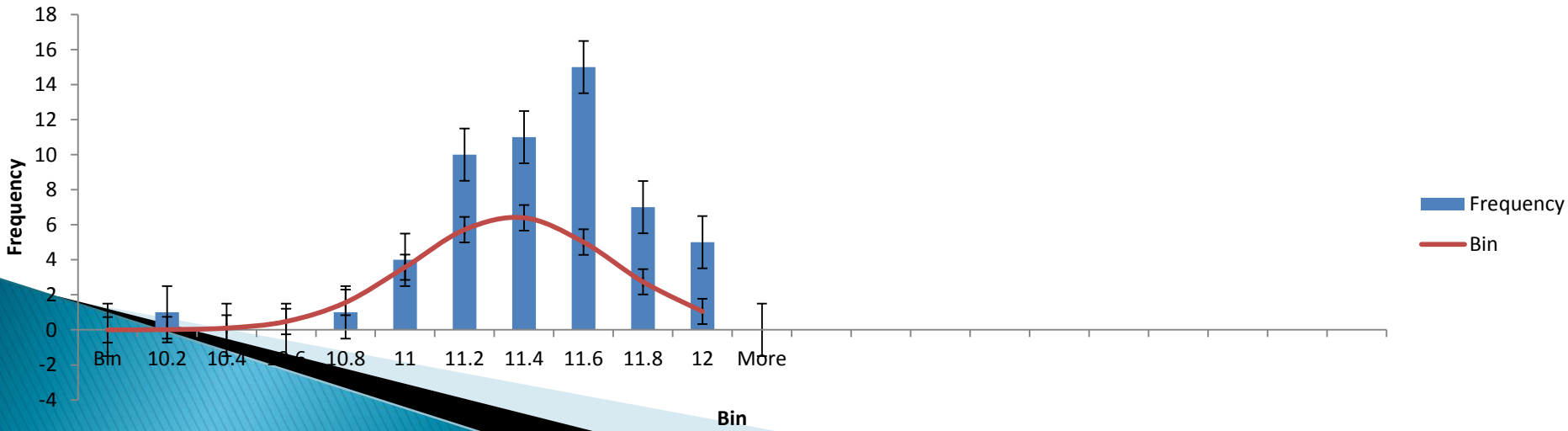
Thickness

- ▶ We are measuring the thickness in order to correctly place the wires in the detector at Jefferson Lab that will hold the aerogel
 - ▶ For the SP-15 the thickness is between 10 and 11 mm
 - ▶ The SP-15 tiles have a mean of 10.428 and a standard deviation of .2428
 - ▶ The SP-30 tiles have a mean of 11.363 and a standard deviation of .3346
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Aerogel Thickness (Abigail and Jonathan)



Aerogel Thickness (Jullianna)



Uncertainty

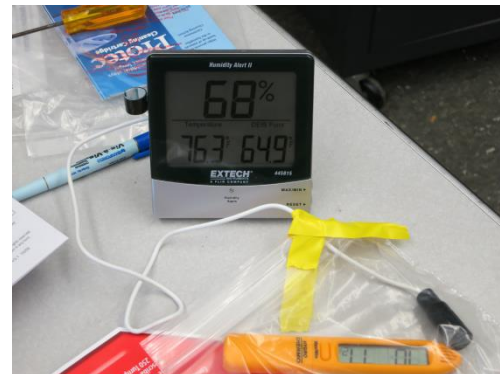
- We are still trying to find the best way to calculate the uncertainty
- At the moment we are using an average uncertainty, which is average deviation over the square root of the number of tiles

Hygrometers

- ▶ GSI Quality Handheld Pen-Shaped Hygro Thermometer (Pen Gauge)



- ▶ Extech 445815 Humidity Meter (Box Gauge)



Calibration and Testing

- ▶ Salt Testing should be 75%
 - Pen Gauge: 72%
 - Box Gauge: 70%



- ▶ Wrap a damp paper towel around the sensor of each and the reading should be between 95 and 100%
 - Pen Gauge: 95%
 - Box Gauge: 99%

Calibration and Testing

- ▶ Humidifier on High
 - Pen Gauge: 78%
 - Box Gauge: 80%
- ▶ Air
 - Pen Gauge: 78%
 - Box Gauge: 80%

Future Plans

- ▶ Test the consistency of the humidifier
- ▶ Test the tiles
 - Test times:
 - 1 day
 - If no effect: 3 days
 - If no effect: repeat
 - If affected: decrease time and see when it starts to be affected. Repeat.