

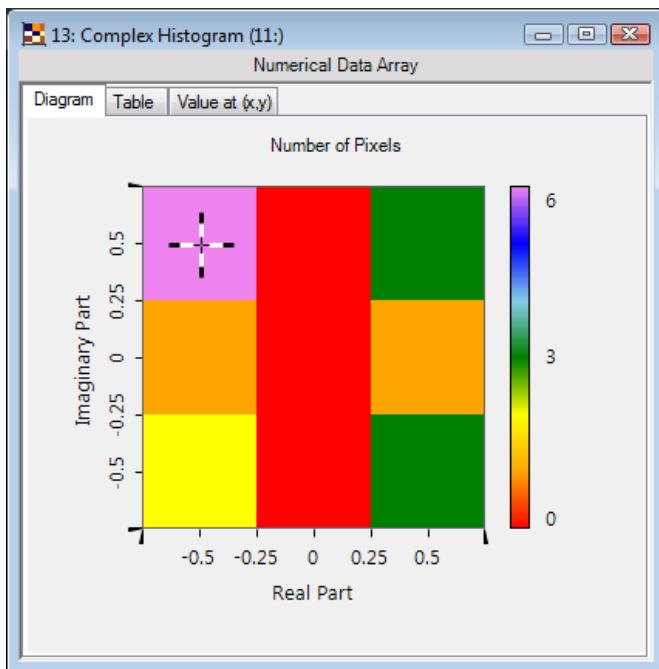
UseCase.0044 (1.0)

Using and Understanding Complex Histograms

Keywords: Complex Histograms, harmonic fields, transmissions

Introduction

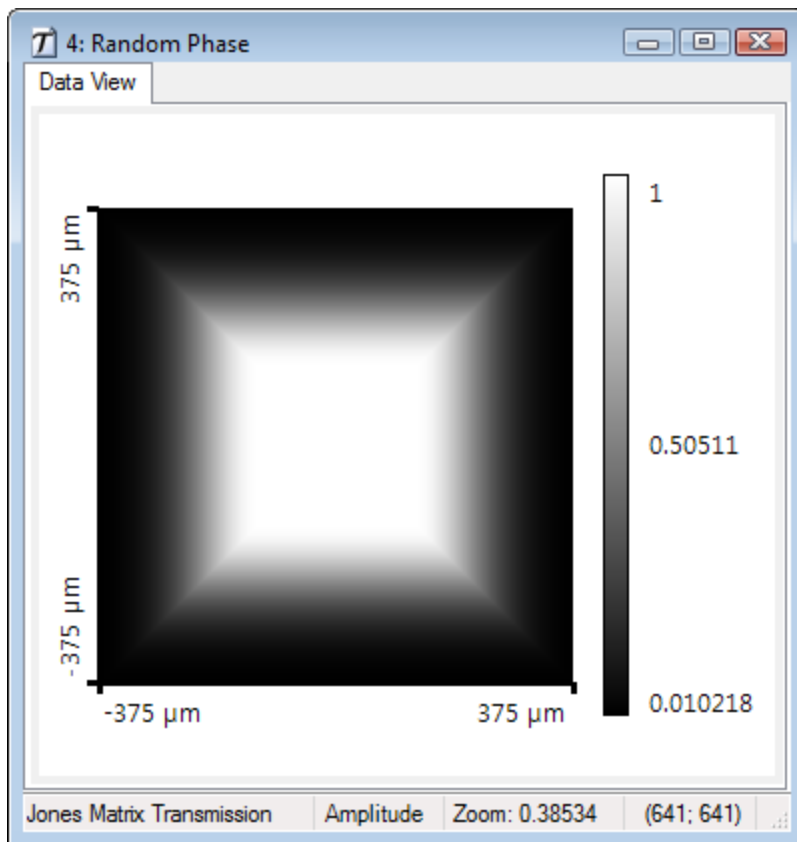
A Complex Histogram is an extension of normal histograms showing how many data points of a complex field lie within a certain range of the real and imaginary part, respectively (“data binning”).



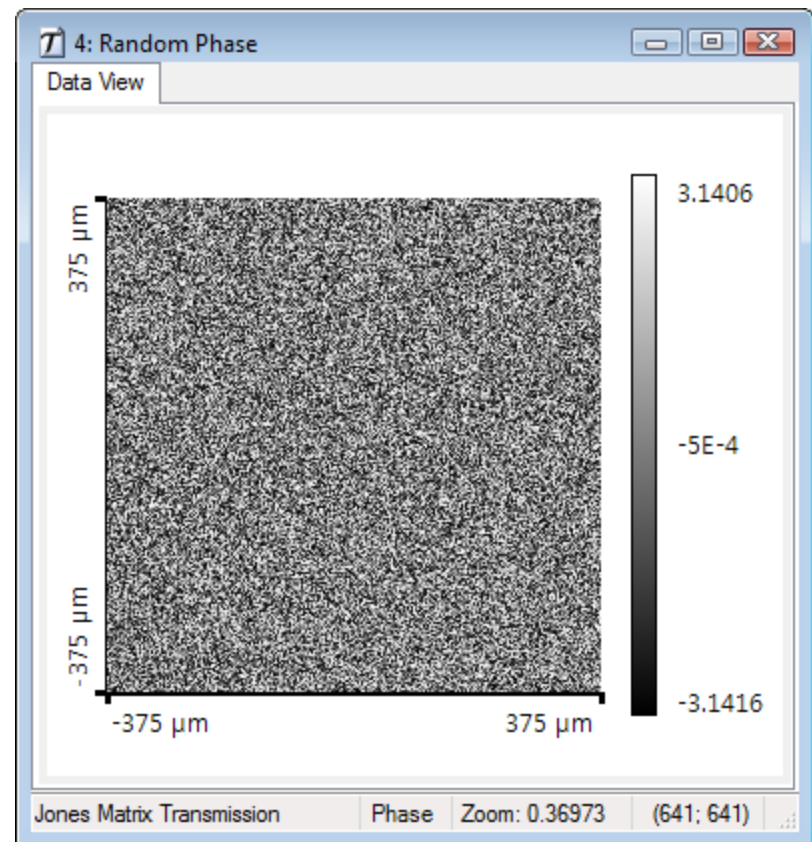
In this example, 6 data points have a real part in the range of -0.75 to -0.25 and an imaginary part of 0.25 to 0.75.

Used Sample Data: Random Phase Distribution

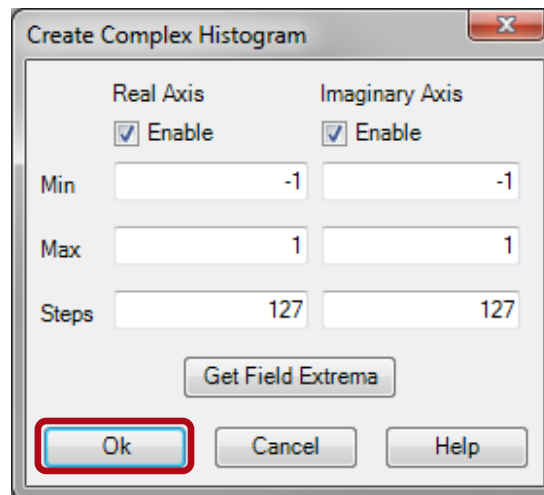
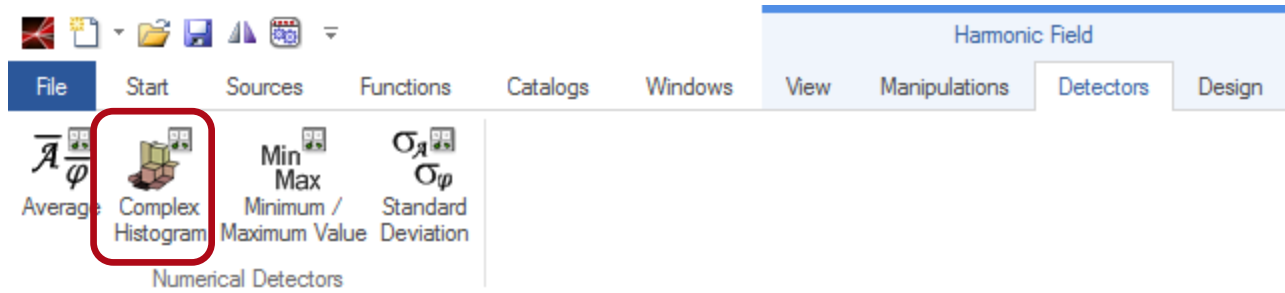
Amplitude



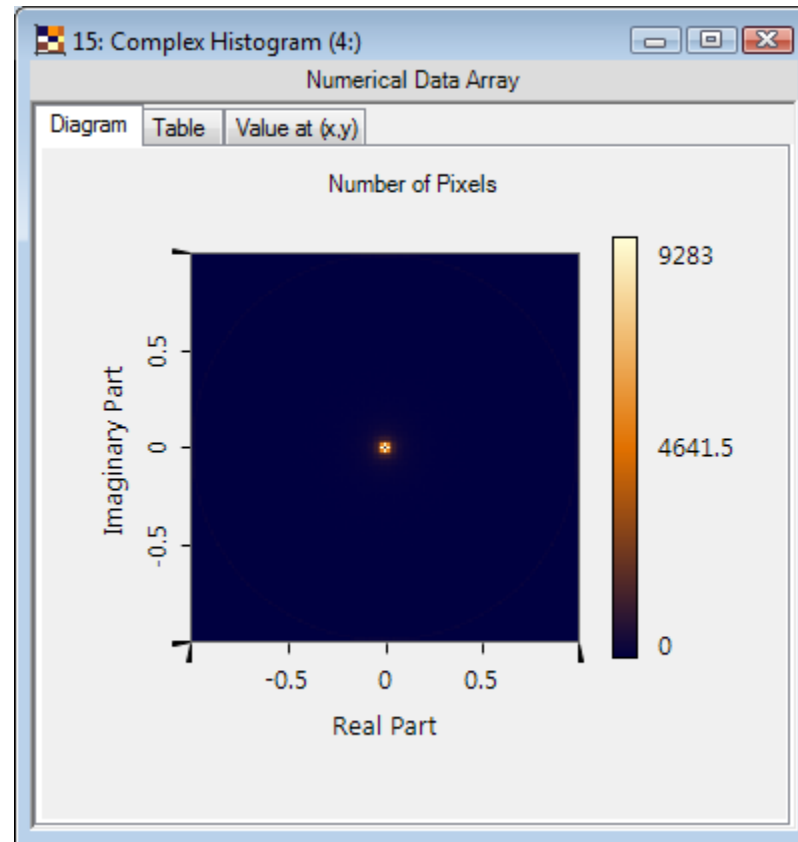
Phase



Creating a Complex Histogram

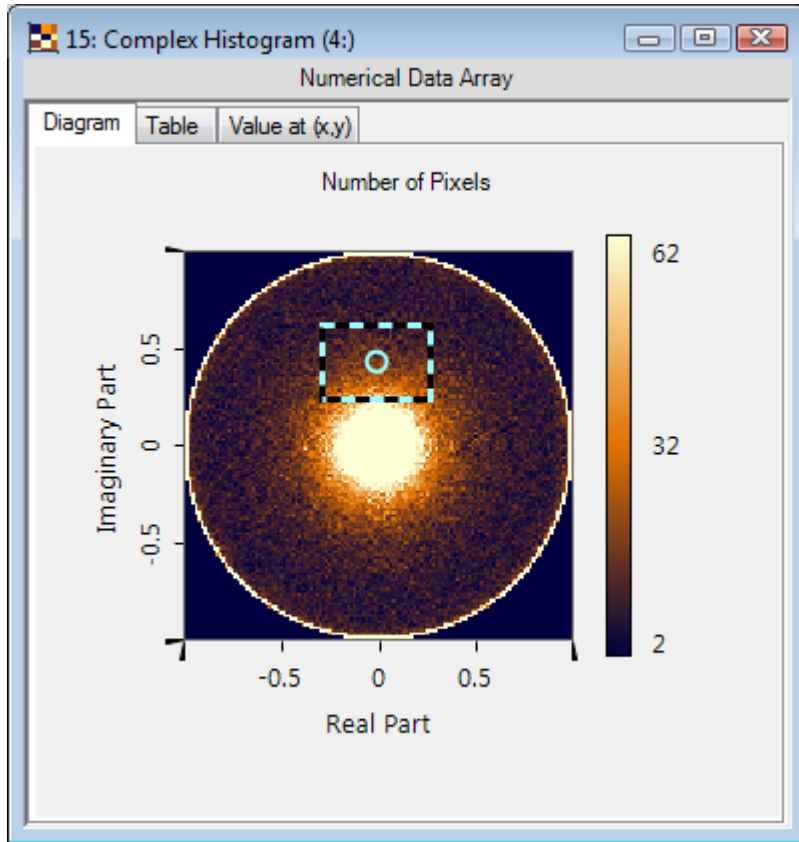


Result



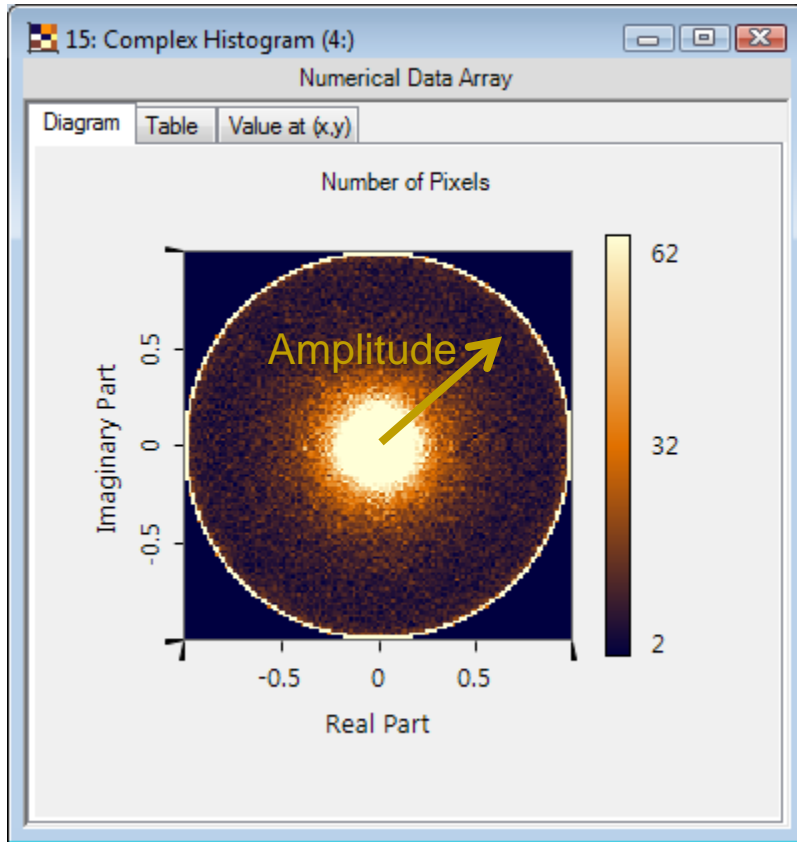
Making the Dark Regions Visible

- Create an arbitrary rectangular marker in the dark region
- Click on **View > Selection Based Scaling**



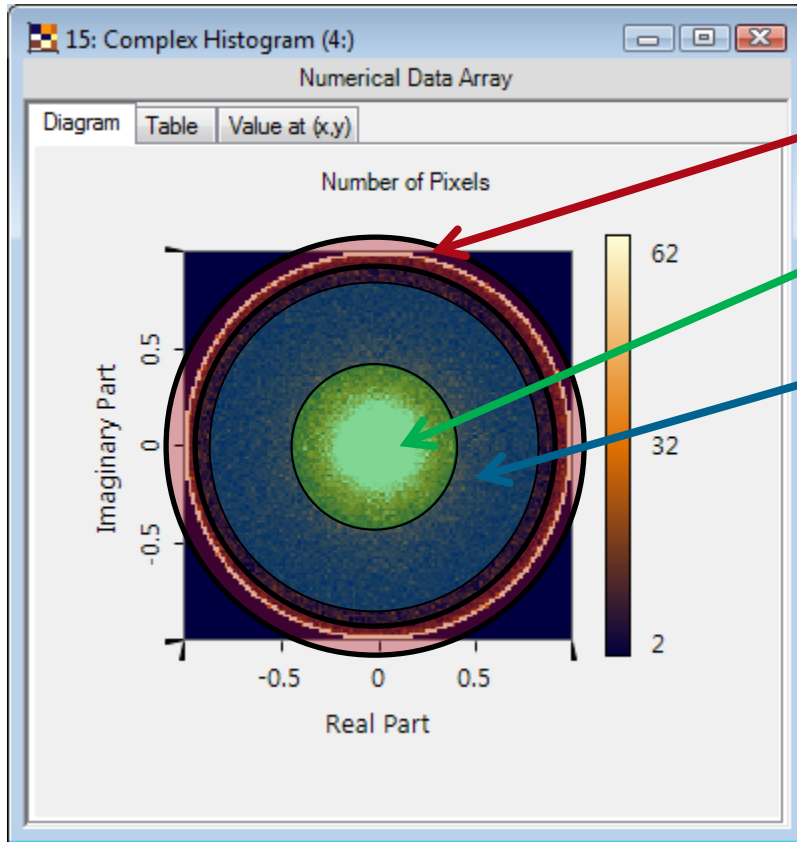
Interpretation: Amplitude

There are many bright pixels and many dark pixels and only quite few pixels with intermediate brightness.



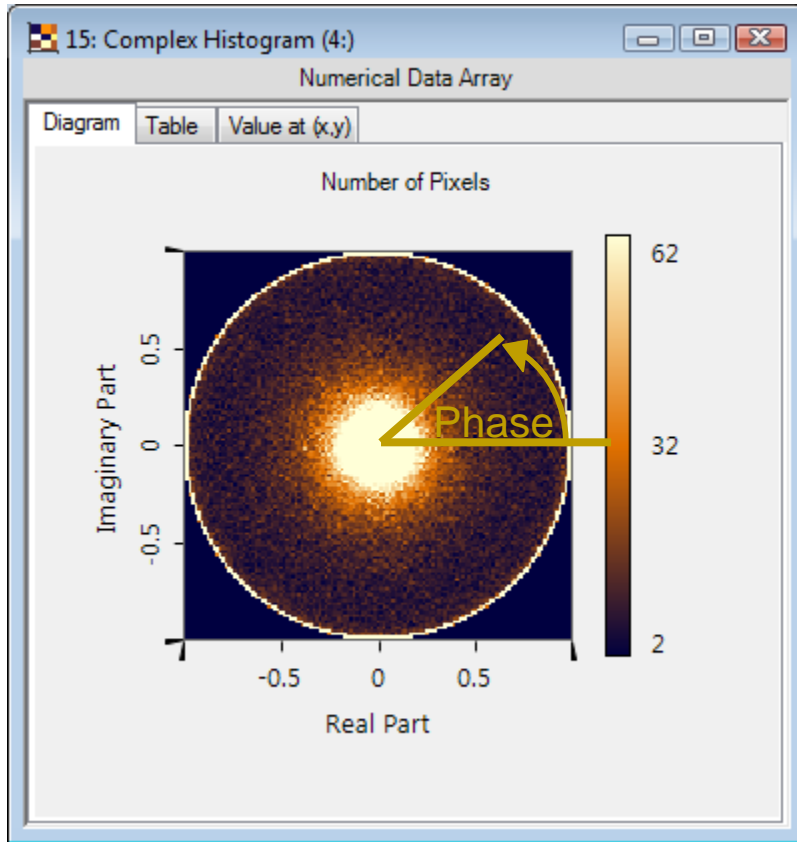
Interpretation: Amplitude

There are many **bright** pixels and many **dark** pixels and only quite few pixels with **intermediate** brightness.

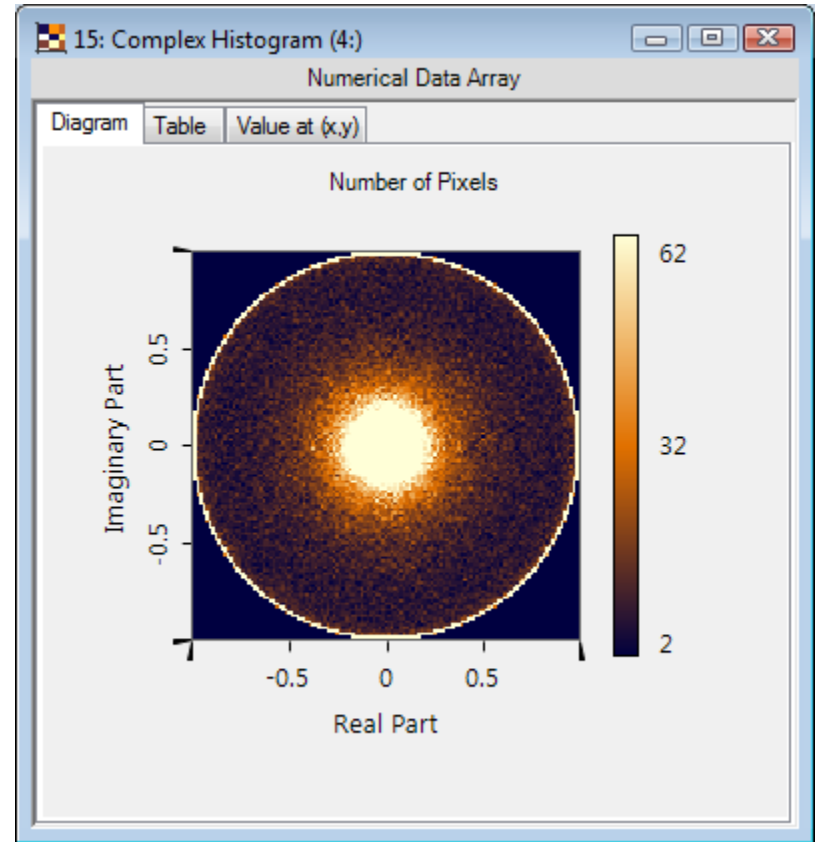
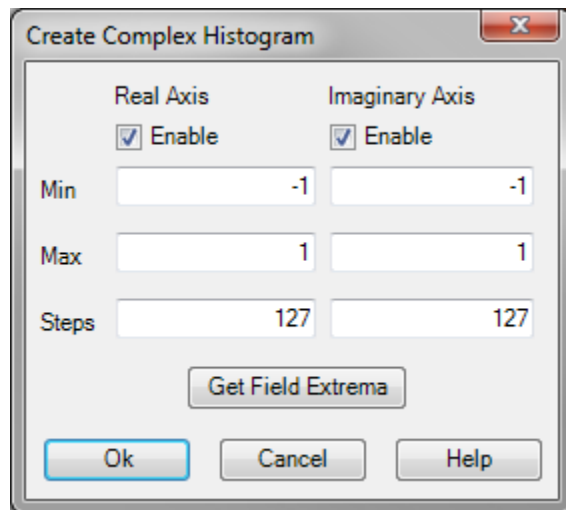


Interpretation: Phase

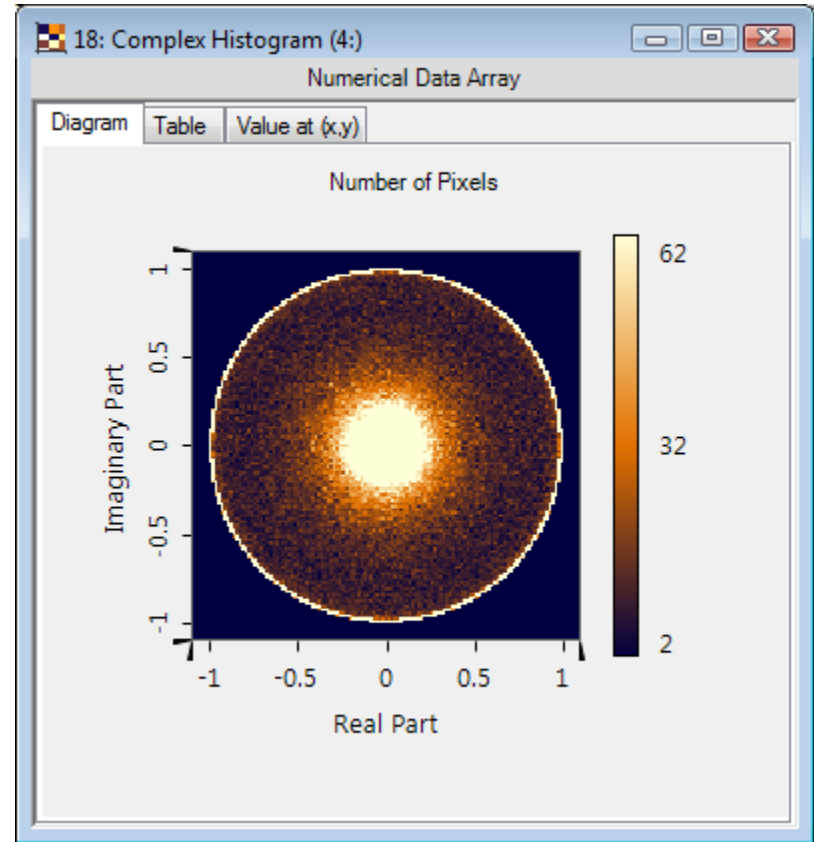
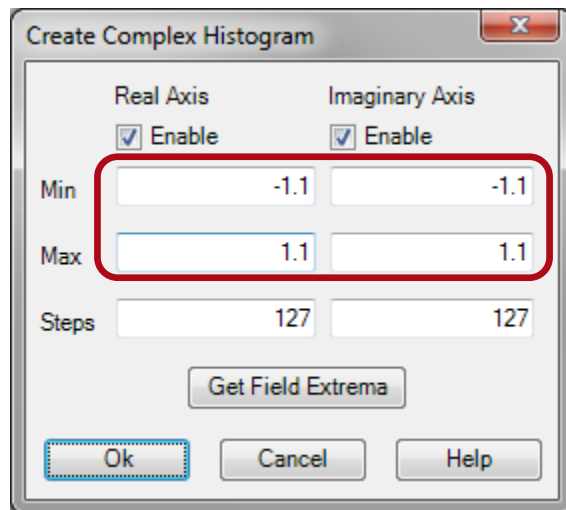
The phase values are distributed uniformly – as expected for random phase distribution



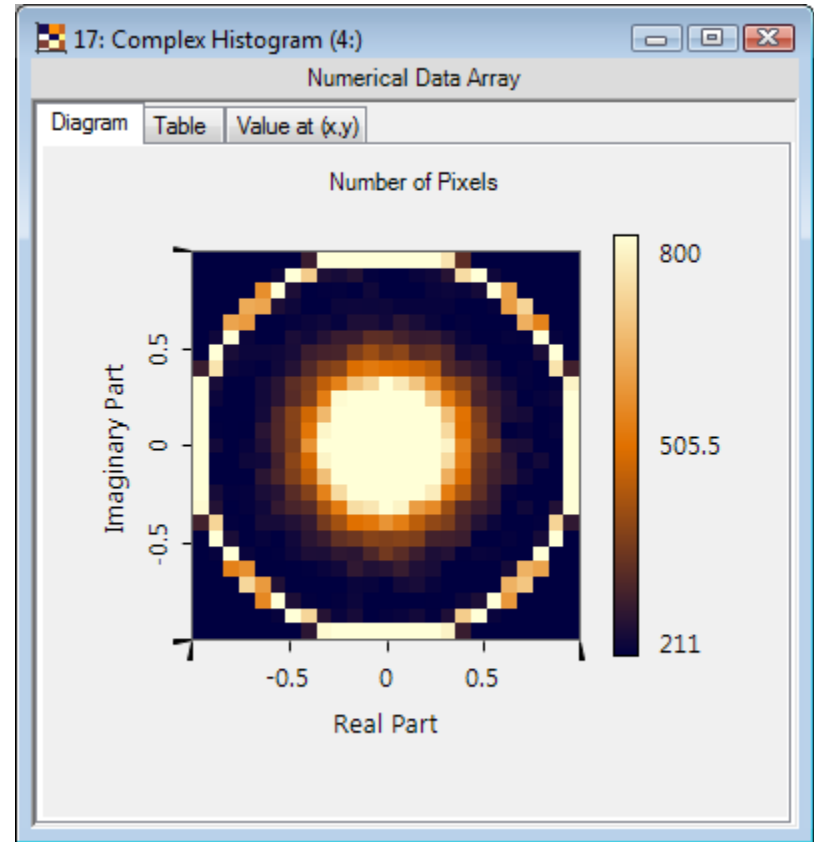
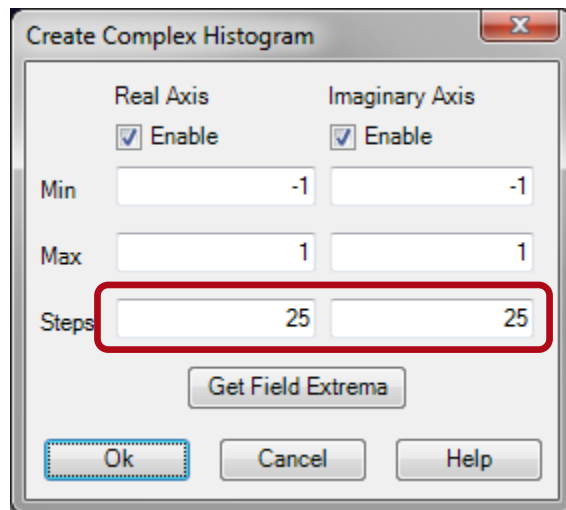
Adjusting the Complex Histogram: Original



Adjusting the Complex Histogram: Embedding

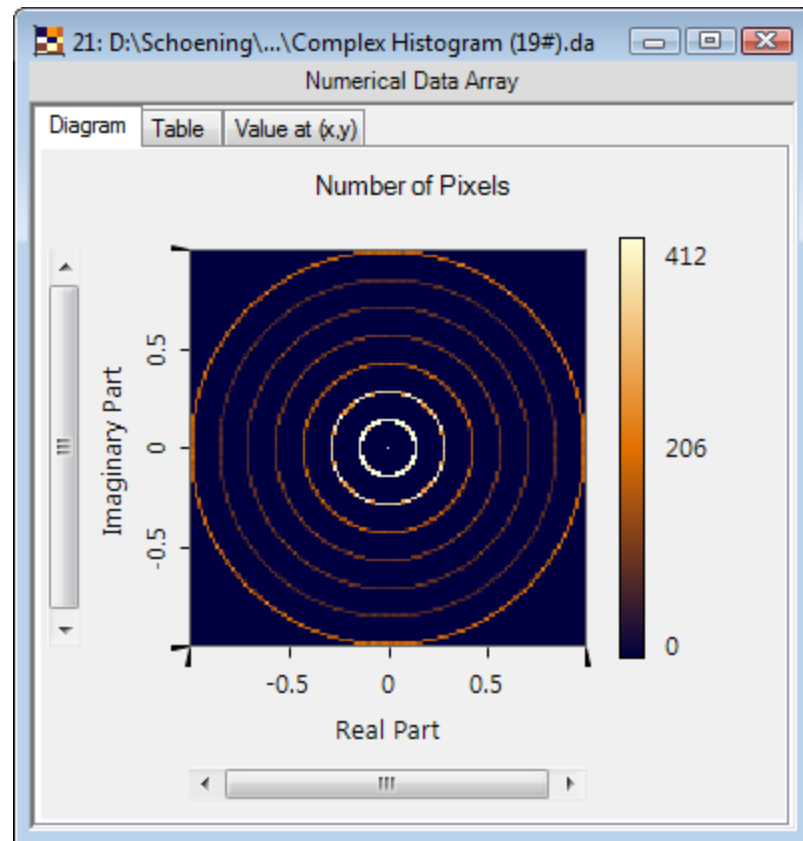


Adjusting the Complex Histogram: Larger “bins”



Effect of Quantization

Result if field was hard quantized before the histogram evaluation with 8 amplitude levels.



Result if field was hard quantized before the histogram evaluation with 8 phase levels.

