# TweezerTracker Reference

## Tracker Settings

The tracker settings directly influence how much accuracy you can get from your images, but also how fast the localization algorithm can compute positions. The internal details of the algorithms are beyond the point of this document (see [link](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3353059/)) [[[1]](#footnote-1)]). However to use the tracking software it is important to know how the ROI size and settings influence accuracy and speed of the tracking algorithms.

Both QI and the Z Lookup table (ZLUT) algorithms will compute interpolated pixel values in a circle within the given images. The size and sampling density of this circle is defined by the settings that you assign, as shown in the image below. Sampling in polar coordinates could be easily defined by having number of radial steps and a number of angular steps, but this would typically have to be changed every time the camera magnification is modified (in which case the region of interest also needs to change). To prevent this, all tracking parameters are relative to the size of the region-of-interest.

Rmin = MinRadius (pixels)

Rmin

ROI (pixels)

ROI (pixels)

Diameter = ROI coverage \* ROI size

Angular sampling density

Radial sampling density

Sampling circle:

* MinRadius: Start radius of the sampling circle
* ROI coverage: Converts the ROI size into the diameter of the sampling circle. Typically 0.8
* Radial sample density: Samples per pixel in radial direction. Typically 2.5
* Angular sample density: Samples per pixel in angular direction. Typically 0.7

Other settings:

* QI iterations: Number of iterations of the QI algorithm. 4 gives good
* CUDA Device:
  + >= 0, select device with given index
  + -1: select device with the highest score (score = #Processor \* Clock frequency)
  + -2: use all CUDA capable devices, and distribute the tasks evenly. Dual-GPU cards like GTX 690 need this.

1. Non-Bias-Limited Tracking of Spherical Particles, Enabling Nanometer Resolution at Low Magnification (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3353059/) [↑](#footnote-ref-1)