Reconstruction step by step
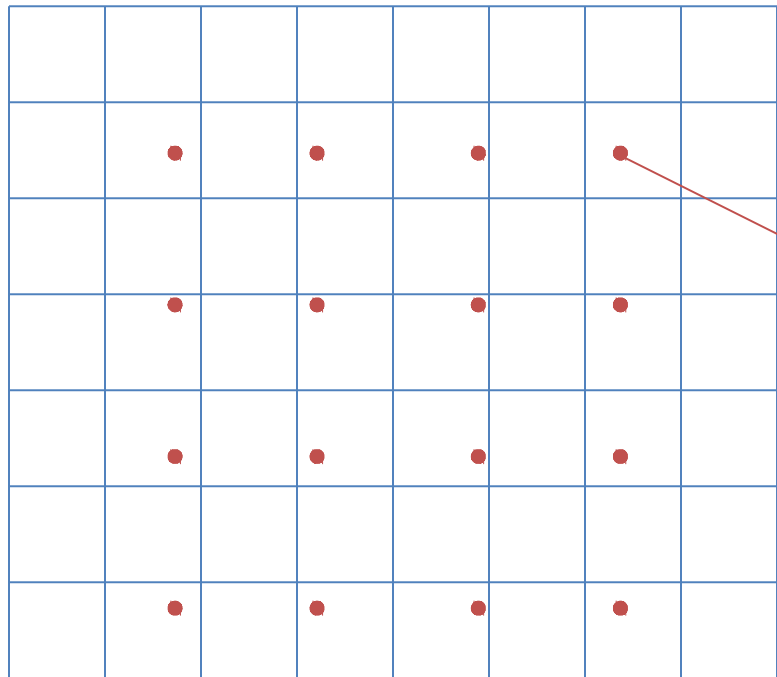
Definition image pixel grid

Detector plane

Imaging plane 1:

Imaging plane 2:

Imaging planes:
intersection of the line focal spot
to detector defines pixel grid
Note: pixel size changes with
distance from source.
Pixel grid is subdivided for
better resolution (also called m-
factor). We use m=10

Source plane

Focal spots
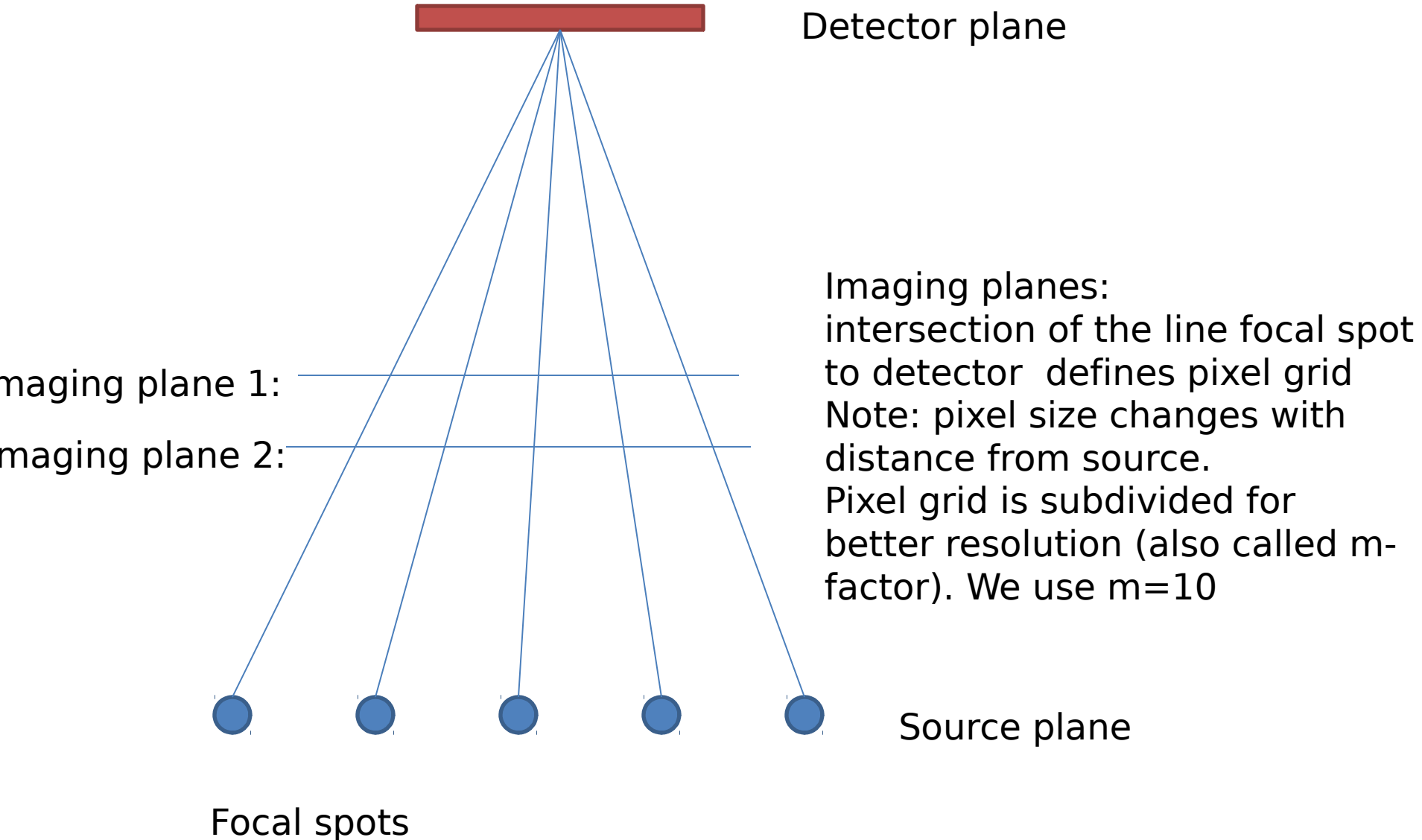
Project detector onto imaging plane

Detector plane

Detector pixelation

Imaging plane 1:

Imaging plane 2:

Project detector pixels along line pixel position at detector plane and focal spot position. Note: image of detector appears minified in plane 1 and even more minified in plane 2. Detector pixel can be expressed in number of imaging plane pixels. This is referred to as n.

Source plane

Focal spots
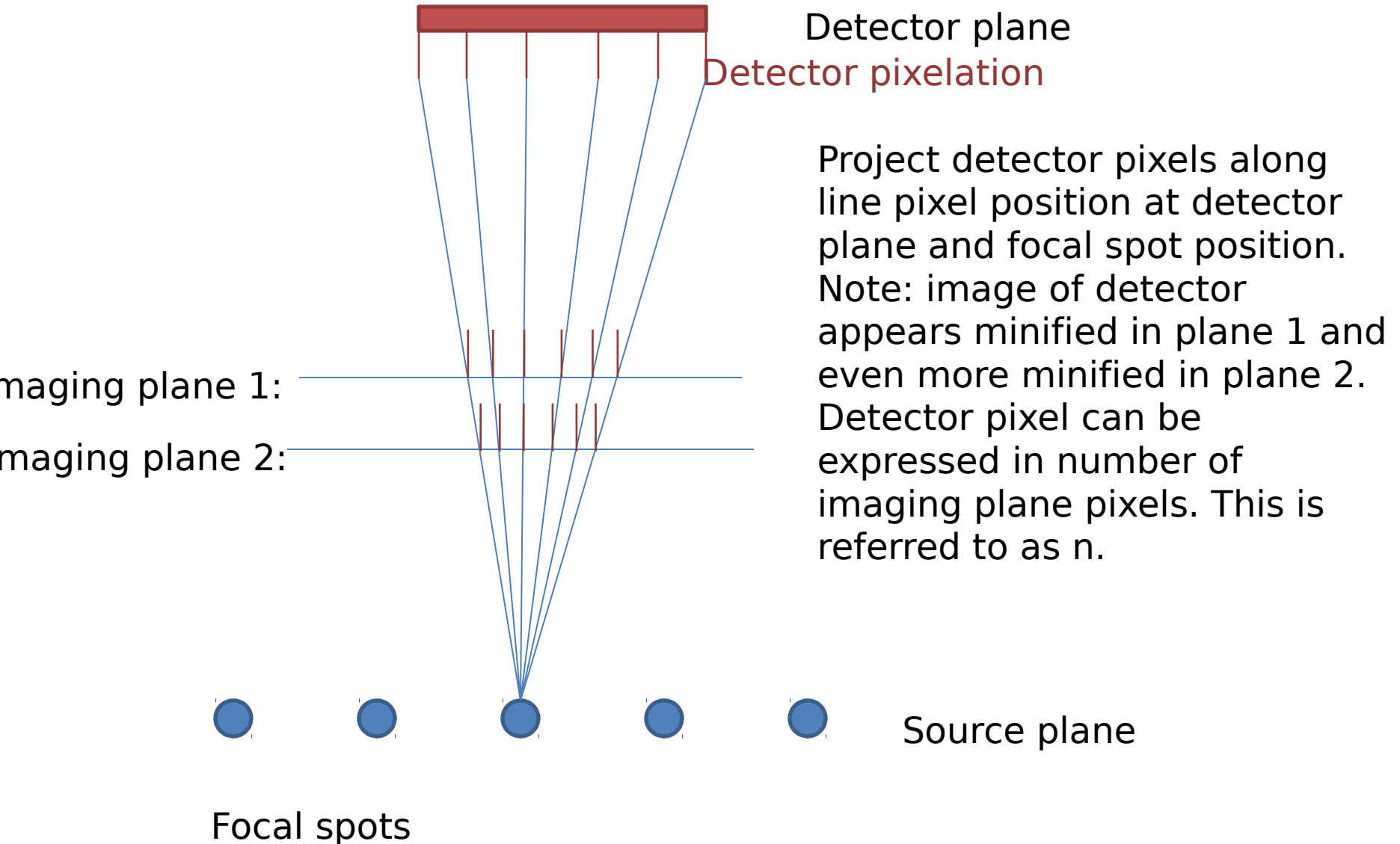
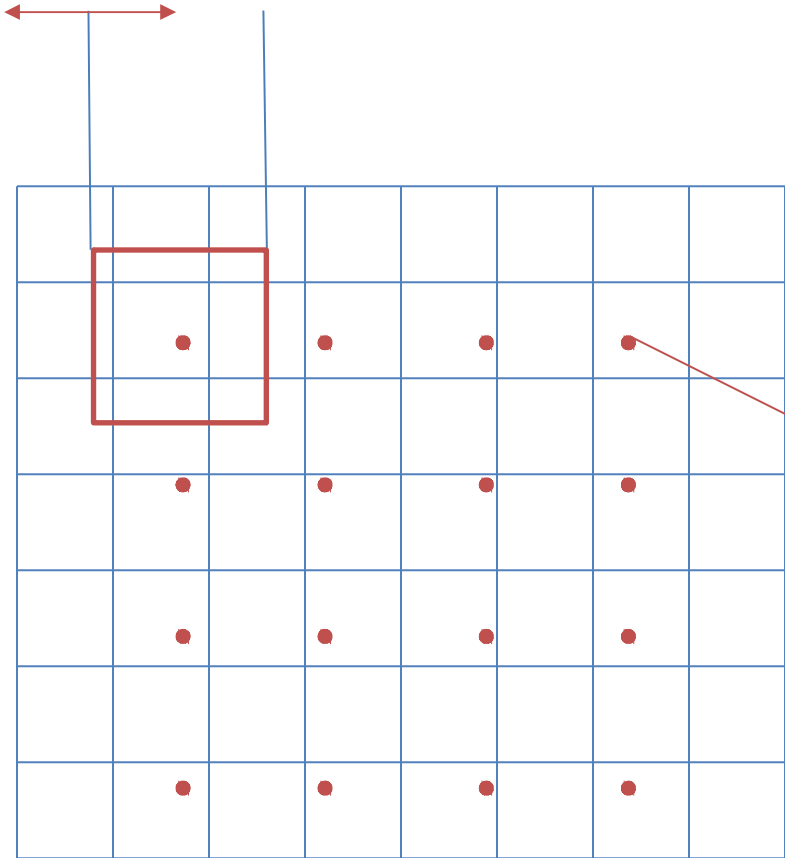# Resulting intersection points in one imaging plane in 2-D

Imaging plane pixelation

Intersection points line detector pixel center and source

Fractional binning

Spread: expressed in imaging plane pixels

Imaging plane pixelation

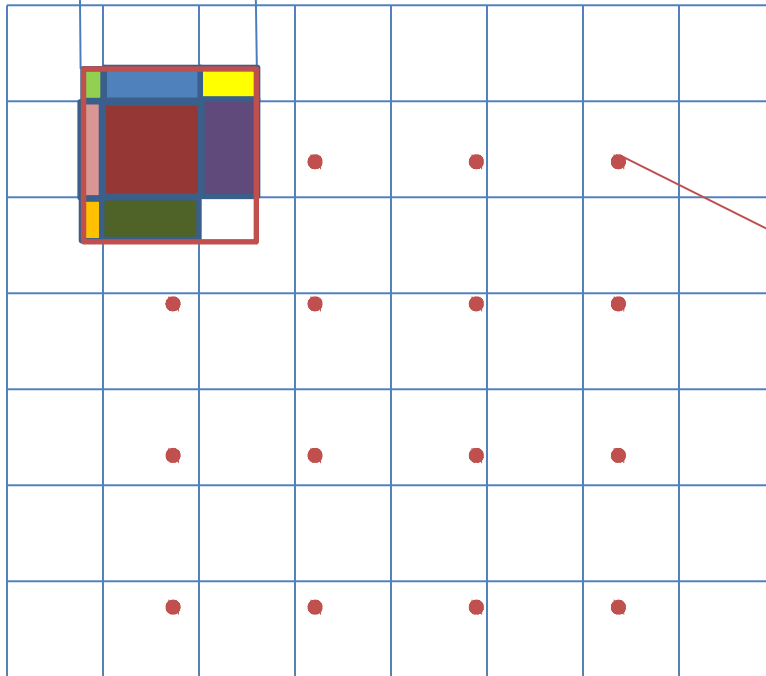Intersection points line detector pixel center and source

Fractional binning

Spread: expressed in imaging plane pixels

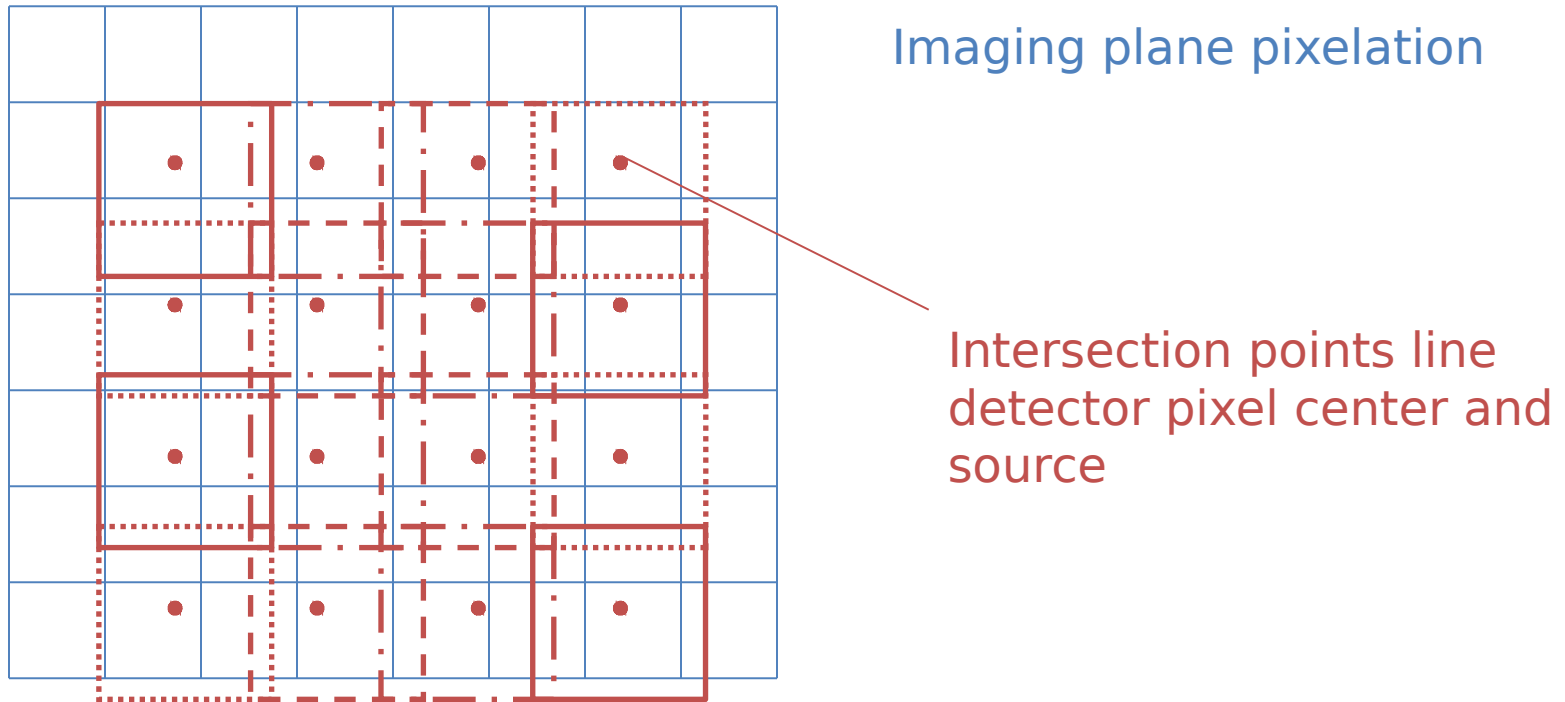Calculate weights according to area taken up on imaging plane pixel

Imaging plane pixelation

Intersection points line detector pixel center and source

Fractional binning

Weights can be pre-calculated for entire detector projected on the imaging palne

Imaging plane pixelation

Intersection points line detector pixel center and source

Extension to multiple source positions

Next collimator hole is just a shift by 10 imaging plane pixels
Weights are shift invariant!
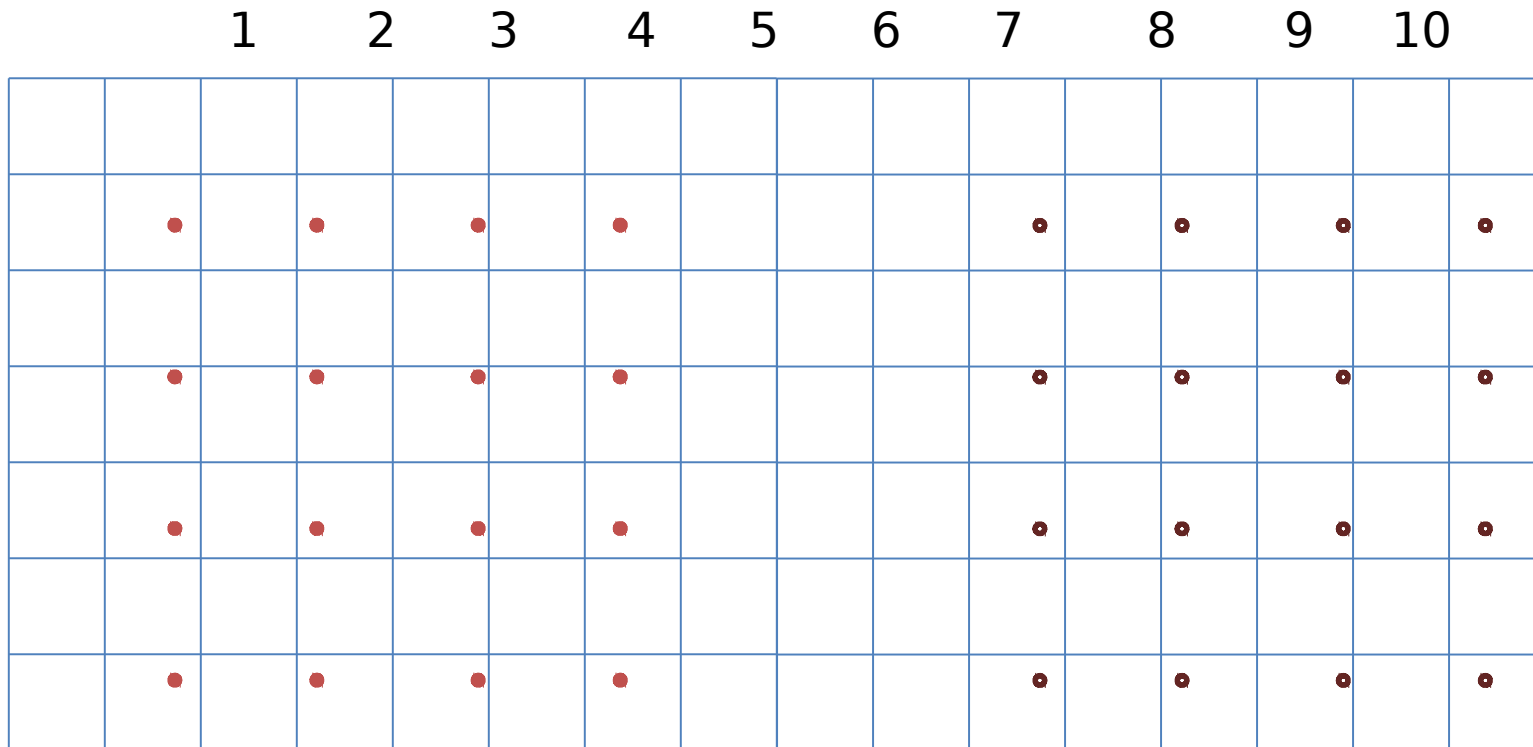
- Click to edit Master text styles
  - Second level
  - Third level
    - Fourth level
      - Fifth level

Focal spots at collimator