Curves, $g_i(z)$ are of fixed action, constructed so that the area between them is a constant fraction of the bucket area.

$$g_i(\mathrm{z}) : p^2 + \frac{2\nu^2 E_s e V_{rf}}{\eta h c^2} \cos(2\pi \mathrm{z}/\lambda) = \mathrm{constant}_i$$

$$f_i(\mathrm{z}) = g_i(\mathrm{z}) - g_{i+1}(\mathrm{z})$$

$$D(\mathrm{z}) = \sum_i a_i f_i(\mathrm{z})$$

where D(z) is the beam density distribution in z.
This is what the SBD measures.
The figures show 10 curves; in practice we use 25.
The $f_i(z)$ are precalculated at 25 points and we fit the measured distribution for the a_i .