# IP tuning scanning precomputed knobs

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## Presentation of the method

### summary of the method

- Simulate ATF2 with $\frac{1}{10}$ of agreed static errors (e.g. list by G. White). Similar to situation after BBA ?
- Steering correction in EXT and FF with correctors and quad movers.
- compute orthogonal knobs for $\frac{<xx_p>}{\sqrt{<x_0^2><x_{p_0}^2>}}$, $\frac{<yy_p>}{\sqrt{<y_0^2><y_{p_0}^2>}}$,
  $\frac{<yx_p>}{\sqrt{<y_0^2><x_{p_0}^2>}}$, $\frac{<y\frac{\Delta E}{E}>}{\sqrt{<y_0^2><\frac{\Delta E_0}{E}^2>}}$, $\frac{<yx_p x_p>}{\sqrt{<y_0^2><x_{p_0}^2>^2}}$, $\frac{<yx_p\frac{\Delta E}{E}>}{\sqrt{<y_0^2><x_{p_0}^2><\frac{\Delta E_0}{E}^2>}}$.
- knobs using QD0 and QF1 strengths and SD0, SF1, SD4 and SF5 y positions only.
- Scan each knob and measure size.
- Fit a parabola to find minimum, set to this point.

## Presentation of the method

### Upgrades from previous presentation

- Knobs using normalized correlations
  $\Rightarrow$ knobs more orthogonal.
- Knobs computed with similar effects on sizes
  $\Rightarrow$ knobs more orthogonal.
- several iterations tried.
- pseudo-adaptive range of scans
  $\Rightarrow$ correction more precise.
- cancel bad correction if the size increases too much.
- came back to rms measurement.
- minor bug corrections.

# Results with $\frac{1}{10}$ of the nominal errors



proportion of the seed bellow the indicated size
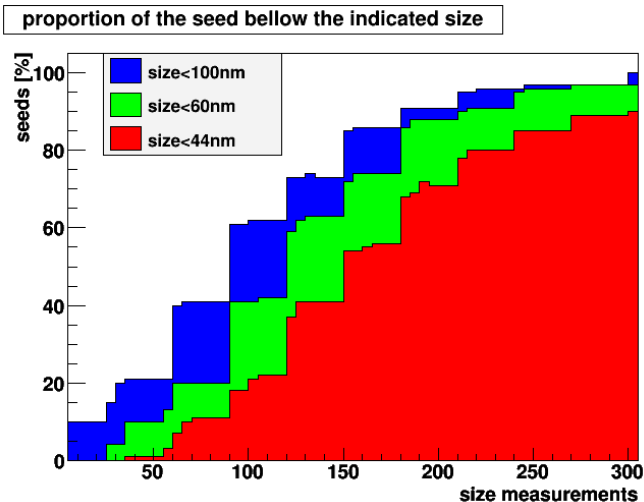
300 sizes mesurements = 7H

# With nominal errors

## Results

- with $\frac{1}{10}$ of the nominal errors, dominant contributions from linear correlations.
- with the nominal errors, dominant contributions from non-linear correlations.
- 15% (resp 5%) of the seeds below 100nm (resp 44nm) after 300 size measurements.
- correlations scanned was mostly corrected.

## With nominal errors

### Prospects

- Identify other important correlations.
- Create new knobs to correct them with other variables : x displacements or roll of the sextupoles, quadrupoles strengths between sextupoles.
- As some corrections are quicker than others, try to correct the larger ones in priority to speed up.
- Try different correction gains for non-linear correlations.
- Would like to use Glen's post BBA seeds, but encounter technical problems.