

Beam tuning update and plans

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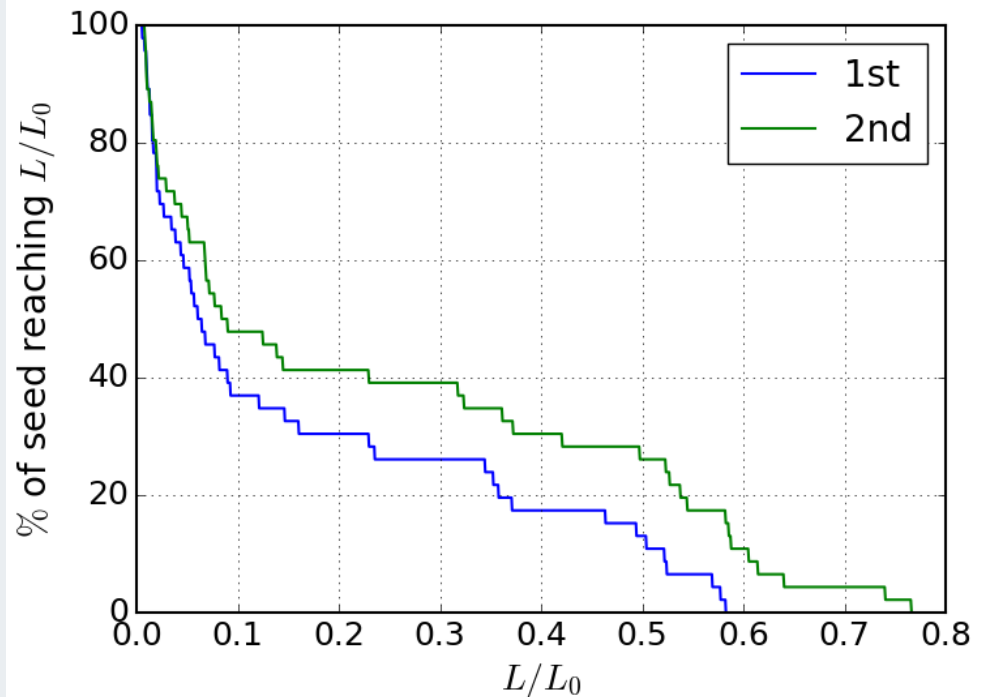
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Outline

- Status from CLIC meeting
- Update on single beam tuning
- Update on two beam tuning

Status CLIC workshop: Two beam tuning

- 2nd iteration: only sextupole knobs
- fairly large improvement
- more improvement probably possible with more iterations

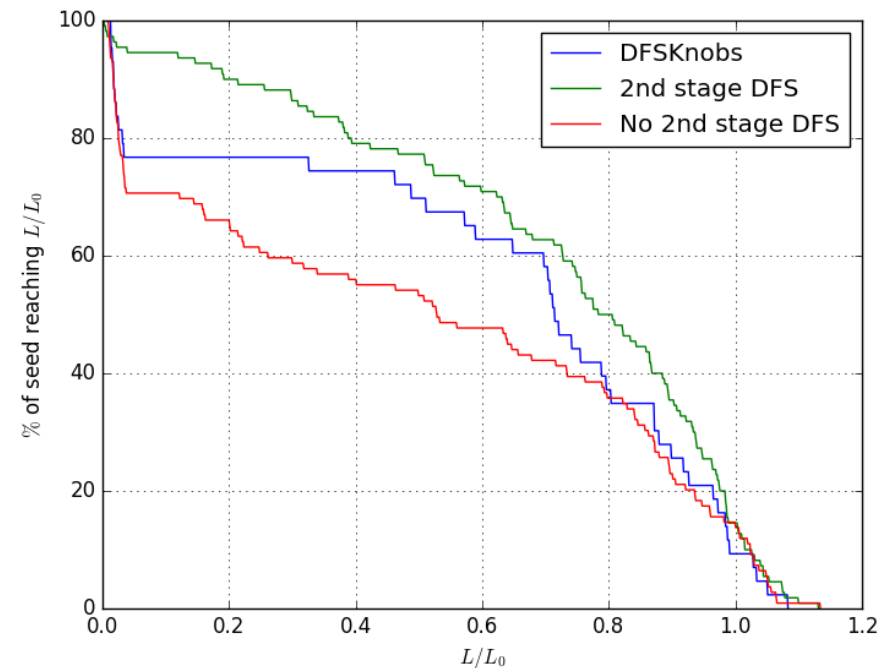


Status CLIC workshop: DFS knobs

- 2nd stage DFS is not always beneficial
- Replace this step with DFS knobs when luminosity already good
 - Instead of matching dispersion, look for maximum luminosity signal
 - more robust, luminosity can only increase

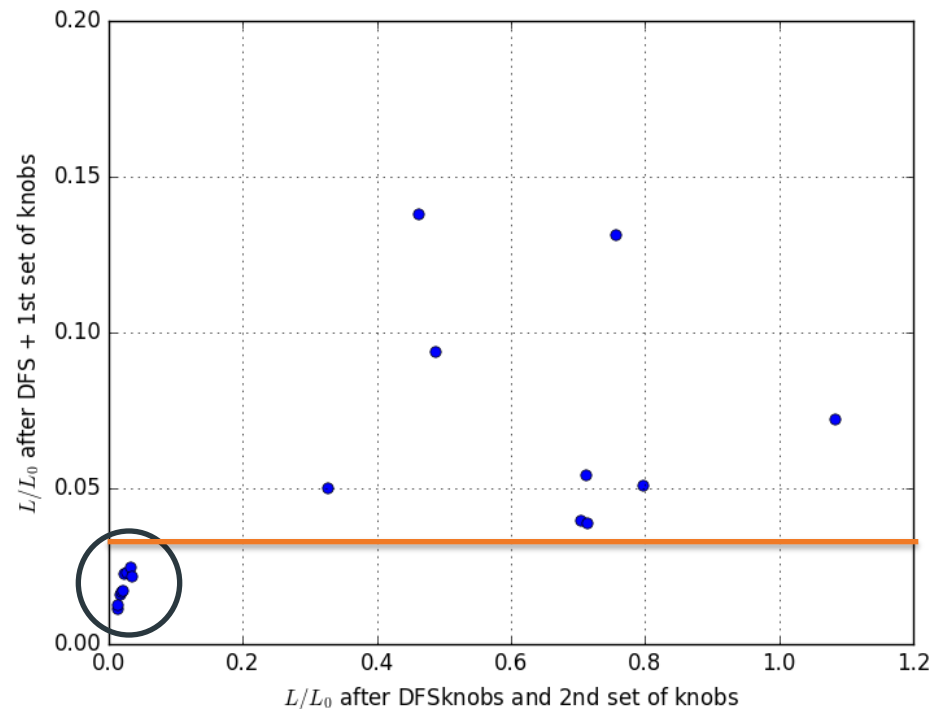
Status CLIC workshop: DFS knobs

- Single beam comparison
- DFS knobs improvement over no 2nd stage DFS
 - large number of seeds with very low lumi
- 2nd stage DFS still performs best



Status CLIC workshop: DFS knobs - zoom

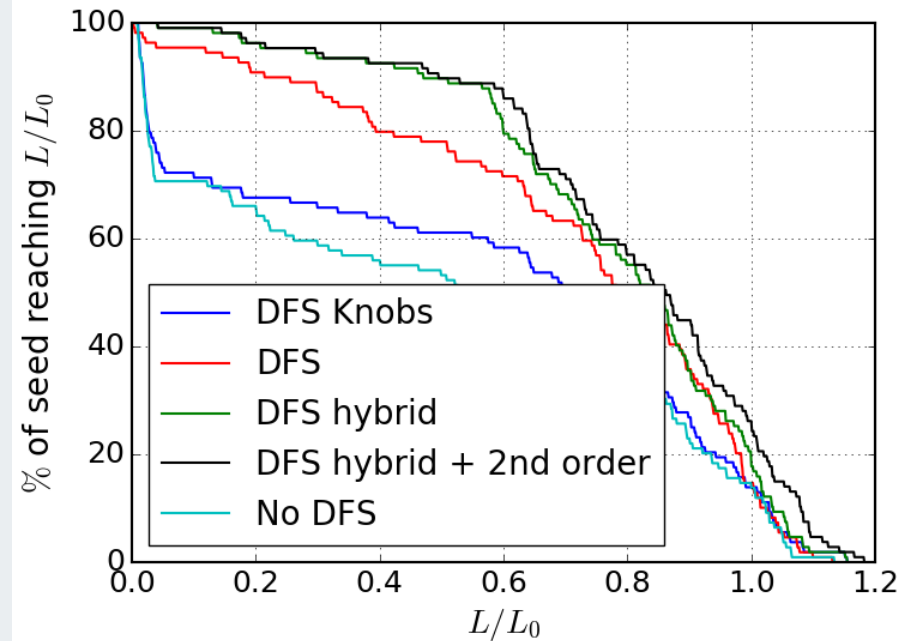
- Knobs are not improving for very low luminosity
 - Not very surprising
 - Clear behaviour difference for $L / L_0 < 0.03$
 - apply 2nd stage DFS only for low luminosity seeds



Update

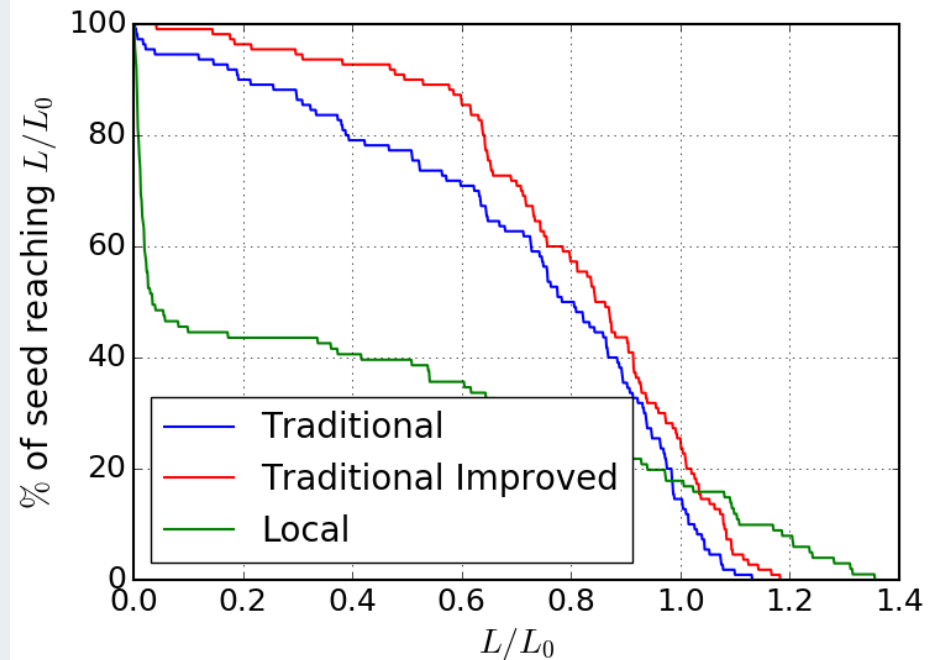
Single beam tuning – 1st iteration

- DFS hybrid:
 - if relative luminosity $> 3\%$ DFS knobs else DFS
- 2nd order:
 - 1 round of 8 simple 2nd order knobs (scanning tilts and strengths of sextupoles used in the knobs).
 - Tilt scan didn't really help
 - as could have been expected since there is no tilt misalignment



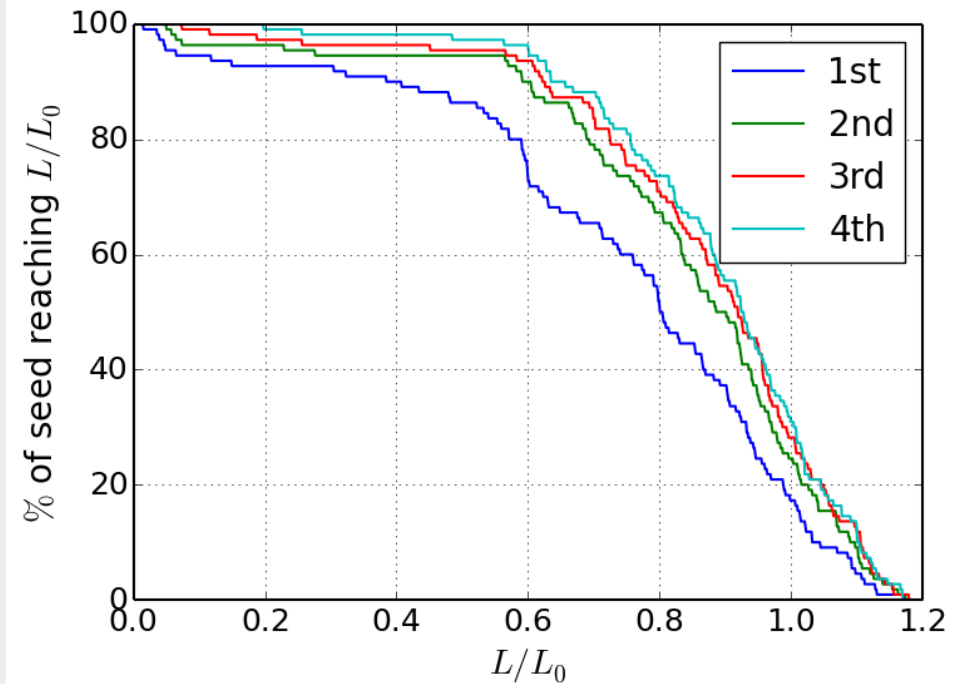
Comparison to local scheme

- New improved simulation for local scheme underway



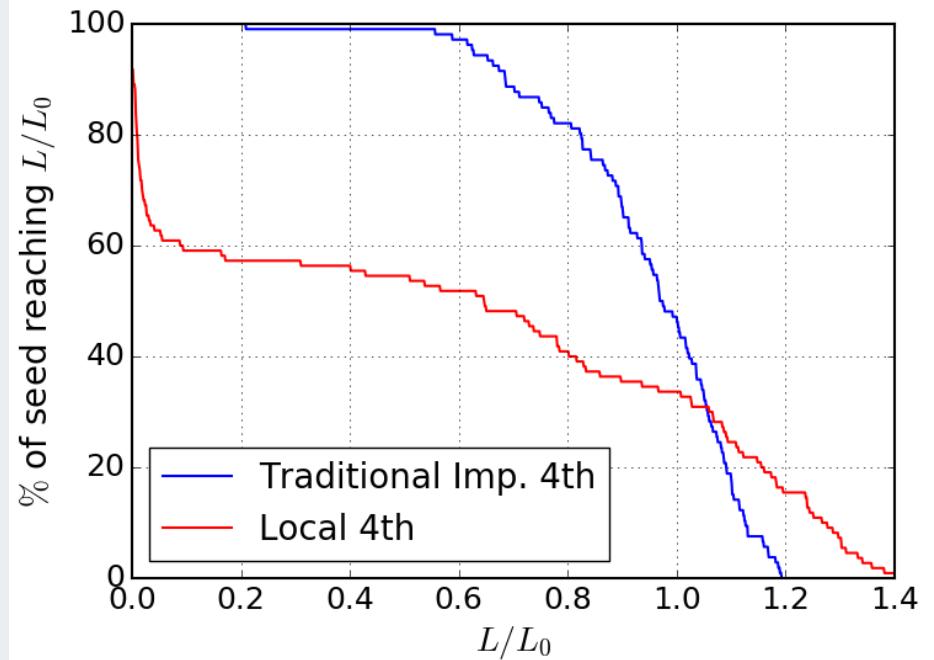
Single beam tuning – multiple iterations

- Multiple iterations
 - without second order
- Large improvement for 2nd iteration, after that not much improvement anymore
 - Seeds with very low lumi still improving
- To reach further some new idea is probably needed again



Comparison with local scheme

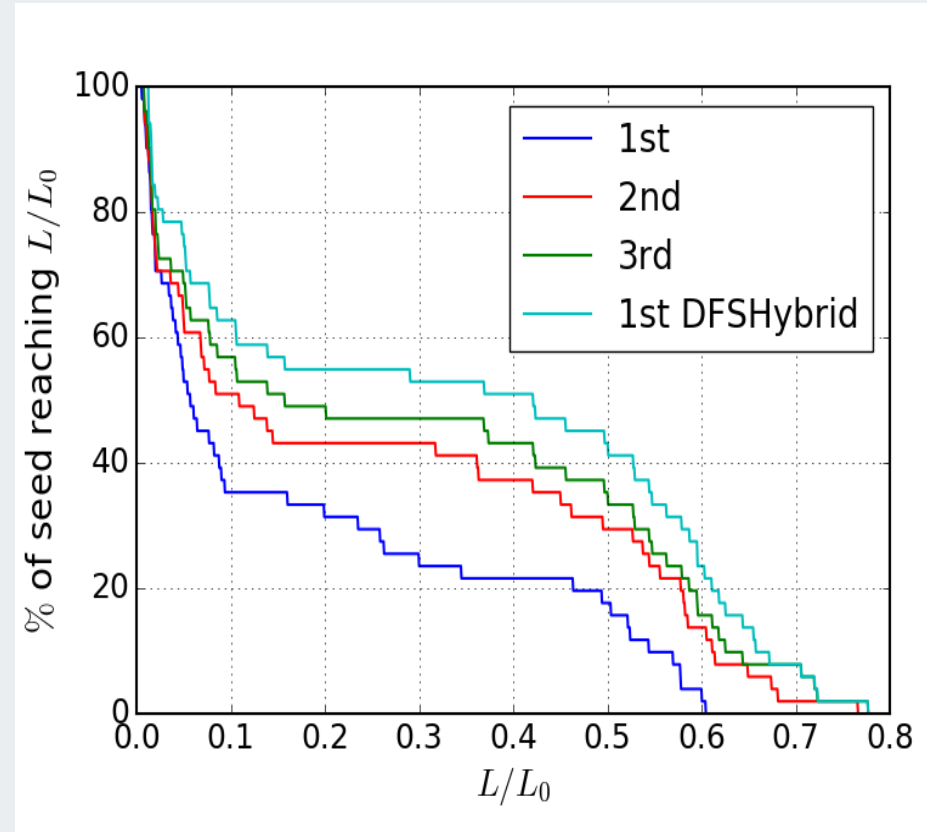
- Again new simulation is needed for fair comparison



Two beam tuning

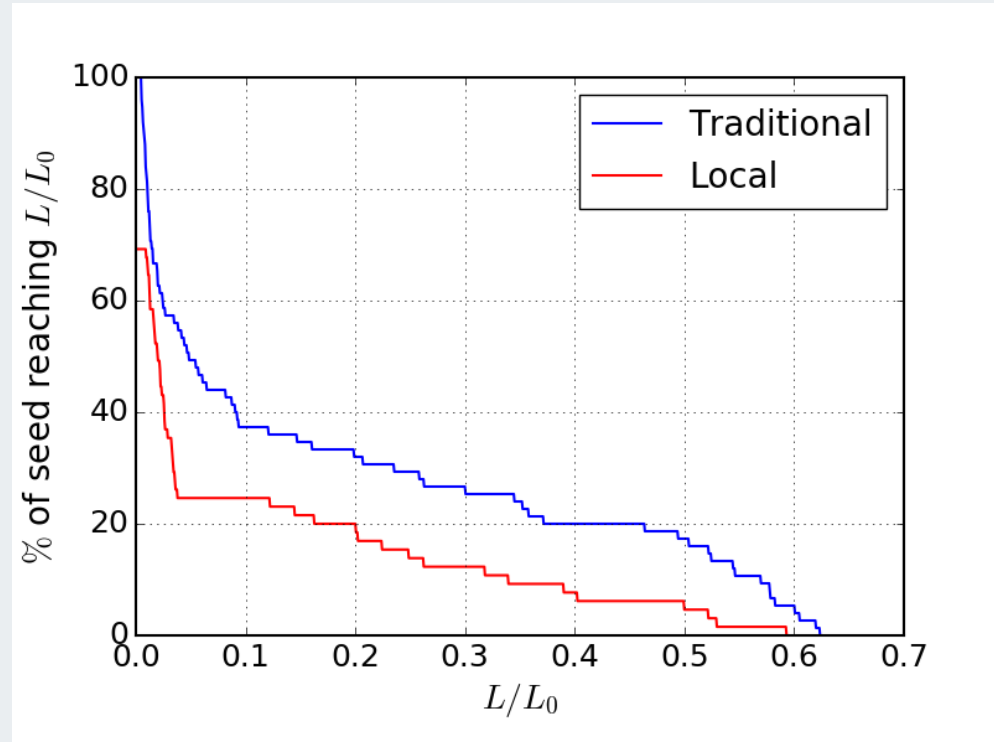
Two beam

- 1st of `hybrid` procedure better than 3 iterations of previous one
- 2nd iteration under way



Two beam tuning – comparison with local scheme

- Comparison to local scheme (from IPAC 2014)



Conclusions

- Improved 'hybrid' DFS algorithm works well
 - Significant improvement
 - No seeds without luminosity, all larger than 20%
 - Further improvements are still needed
- Simple 2nd order knobs helps a little
 - Needs more investigation
- Works also well on two beam tuning

Future plan

- I have been offered a job at PSI, starting in July
 - I will finish my postdoc at RHUL end of May
- Ryan will continue the effort
- I will still be available for help / support

Future Plan

- For IPAC:
 - Improve 2nd DFS step algorithm
 - DFS with updated response matrix to be tested
 - Comparison with local scheme for single and two beam at least one iteration
- After IPAC:
 - Beam aberration study
 - Try to improve current procedure