Experimental Program for QF1FF SC Magnet @ ATF2

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- Swap out the SC magnet for existing QF1FF/SF1FF magnets over summer shutdown period.
- Checkout main quad and sextupole field with usual model checkout procedures
  - Beam transferred to IP ok
  - Transfer matrices to downstream BPMs agree with model
- Checkout of corrector coils
  - Correct IP position response to normal and skew dipole, quad and sextupole fields.
  - Map out beam response to field scans and calculate field centers to provide setting matrix to perform orthogonal shifts of quad and sextupole fields.
  - Test stability of above over time.
  - Use mover system to crosscheck calibration of this correction-coil based system.
- Use corrector coils to align quad and sextupole fields to the beam

- Compare system stability and performance of the ATF2 system in this stage of the tuning compared to previous setup (size and stability of IP beam spot).
- Tune the beam size down to nominal 35nm spot
  - Check use of quad/skew-quad/sext/skew-sext generation in conjunction with other FFS sextupole multiknob system.
- Check performance and stability of fully tuned system compared to previous setup.
  - Final tuned vertical spot size.
  - Speed of tuning convergence (are multiknobs still orthogonal when including SC magnet).
  - Long-term stability of spot size.
  - IP jitter conditions, correlated with interferometer measurements, and evolution over time.
  - EM background conditions as measured by IP beam size monitor system, compared with previous magnets.
- As part of the extended ATF2 program to push to the smallest possible beam sizes (~25nm)
  - Test of the higher-mode quality of the main magnet fields
  - Use of higher-order magnet coil windings (skew-octupole, skew-dodecupole) to cancel high order aberrations introduced by upstream magnets that will degrade the apparent measured beam size at the IP.
  - User of higher-order windings as part of main tuning system.