



U.S. DEPARTMENT OF
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Halls A and C FFB System Readiness

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What is Fast Feedback and why do we need it?

- The function of the Fast Feedback system is to reduce undesirable fluctuations in beam position and energy at the Hall A and C (and now Hall D) targets. The FFB system as a whole is capable of suppressing beam motion up to the first twelve harmonics of 60Hz.
- Many Hall experiments require tight stability of beam position and energy, particularly those requiring high beam current.
- For a detailed description of the FFB system, go to the JLab ELOG webpage->Useful Links->OPS Documentation->User's Guides->Optics->Fast Feedback (FFB) System User's Guide.

History and Present Status of FFB

- FFB worked well during 6GeV, but not during 12GeV. The FFB system was initially not upgraded to account for higher energy beam.
- The FFB system has been going through iterative changes since the start of 12GeV.
- Hall A FFB was used during the Fall 2016 run in energy mode. Hall A beam energy was approximately 8.5GeV. There were frequent DAC saturation errors (i.e. calculated corrections were outside of the ability of the system).
- Software calibration thresholds were modified to accommodate for weaker response from higher energy beam.
- Corrector coil power supplies upgrade from 5A to 10A during the Spring 2017 run to accommodate the higher beam energies for 12GeV, but there was no opportunity to test with higher energy beam.
- 400Hz and 800Hz noise on FFB BPMs: The ADC cards replaced in Fall 2016, but there has been no opportunity to test with beam.
- The FFB RF calibration signal drives 2L26 at a frequency which possibly activates microphonics.

FFB Running During the Fall 2016 Run

Hall A FFB running

Lognumber 3435319. Submitted by [roblin](#) on Wed, 11/02/2016 - 13:53.

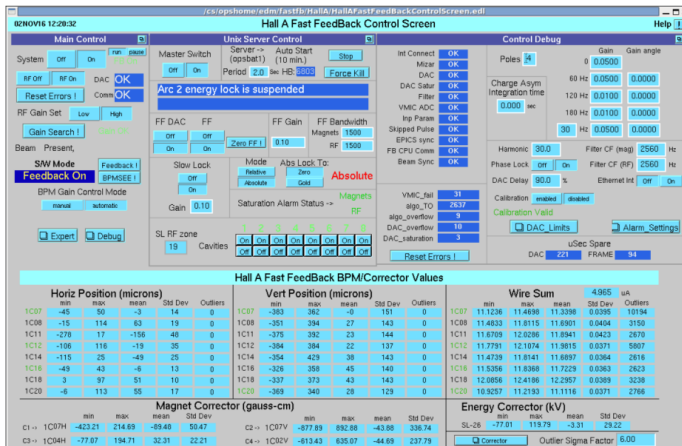
Last updated on Wed, 11/02/2016 - 13:53

Logbooks: [ELOG SLOG](#)

Entry Makers: [roblin](#), [higgins](#)

Fast Feedback is successfully running for Hall A in energy mode. We first tested running the system in position mode and verified that the system switched to absolute mode (Fig. 1, 2, 3). We then tested running the system with energy mode on and the system switched to absolute mode (Fig. 1, 2, 3).

Figure 7 shows the magnet and BPM selections.



Members:

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- Yves Roblin
- Scott Higgins
- Dave Gelhaar
- Pete Francis
- Jay Benesch

Goals:

- Get FFB working as it worked during 6GeV.
- Operators should be able to configure and run FFB as a matter of routine.
- Develop testplans to fully test and commission FFB for the upcoming run.

Summary of Proposed Test Plans

- Verify adequate beam response from upgraded FFB corrector coil power supplies.
- Excite vernier on 2L26 to see if it activates microphonics.
- Troubleshoot noise on Hall A and C FFB BPMs via FFT. ADC cards for FFB BPMs were replaced, but not tested.
- Attempt to turn on, set up, and fully check out FFB with 11GeV CW beam to each of Halls A and C.

- **We need beam time for testing.**
- Should we move the FFB vernier and energy locks from 2L26 to 2L21 to maximize gradient in 2L26?
- How do the C100s react to being driven at FFB frequencies? What are the C100s putting on the beam?
- What exactly are the user's requirements of FFB? Is the present system good enough, or is it too good?