

Preliminary results from RACE at UT experiments

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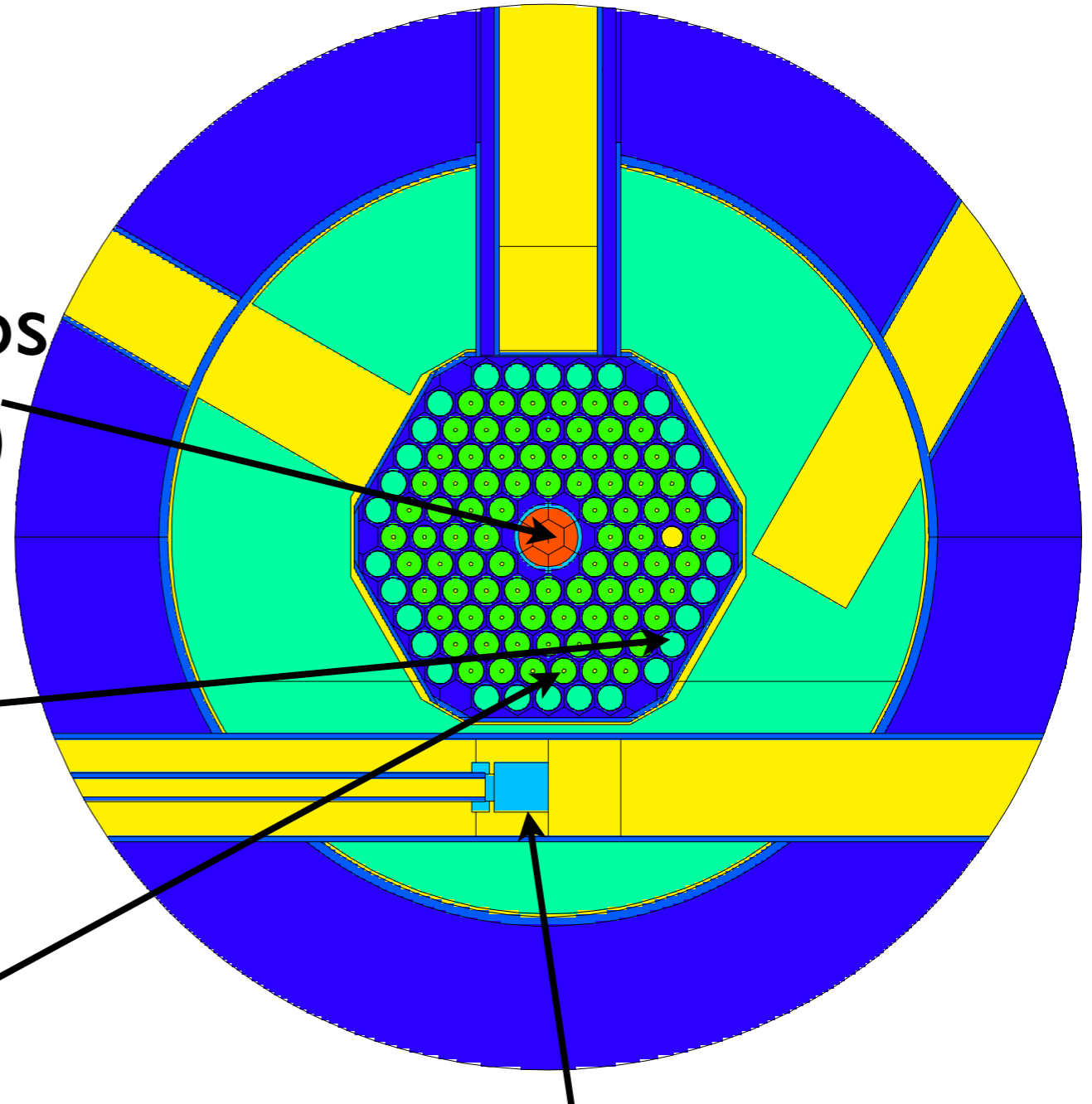
ADS experiments at NETL

- Neutron flux timing data with fission chambers (FC) (16 mg ^{235}U , 1 count/ 10^3 n)
- Experimenting with electronics to overcome line noise (ground loops are bad)
- FC data from different **positions**, as function of **reactivity** (control rods, fuel), linac rep. **rates**, using fast and regular **pre-amplifiers**

NETL core

```
05/25/05 09:40:15
***** UT-TRIGA - Core Model
01/26/00 ***** Case:

probid = 05/25/05 09:38:59
basis: XY
( 1.000000, 0.000000, 0.000000)
( 0.000000, 1.000000, 0.000000)
origin:
( 0.00, 0.00, -6.99)
extent = ( 75.00, 75.00)
```



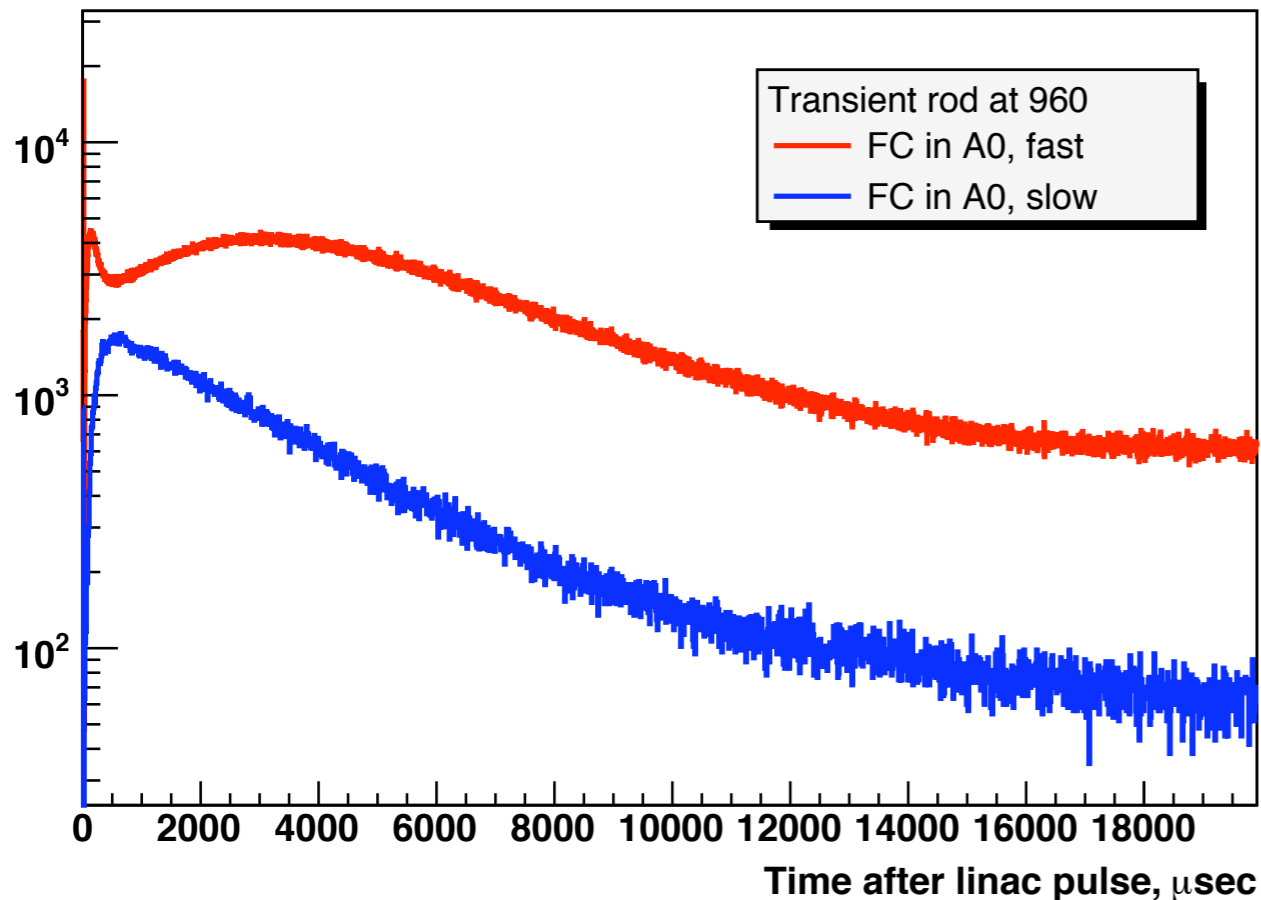
A0, fast and slow pre-amps
(fit & area methods, rate)

G5, fast pre-amp
(fit & area methods)

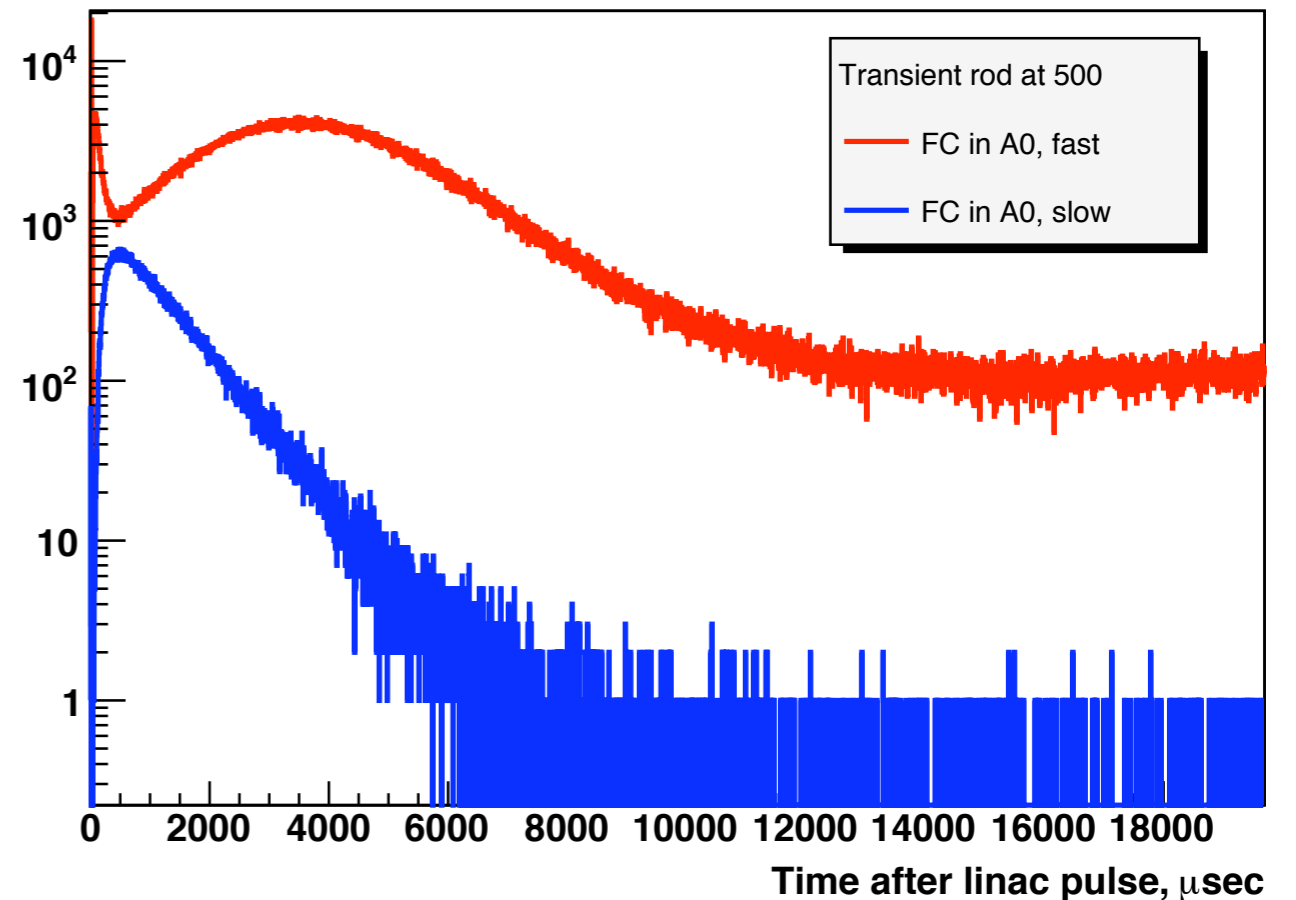
F8, fast pre-amp
(rate dependence)

Cu-W Target

FC at A0 with various pre-amplifiers

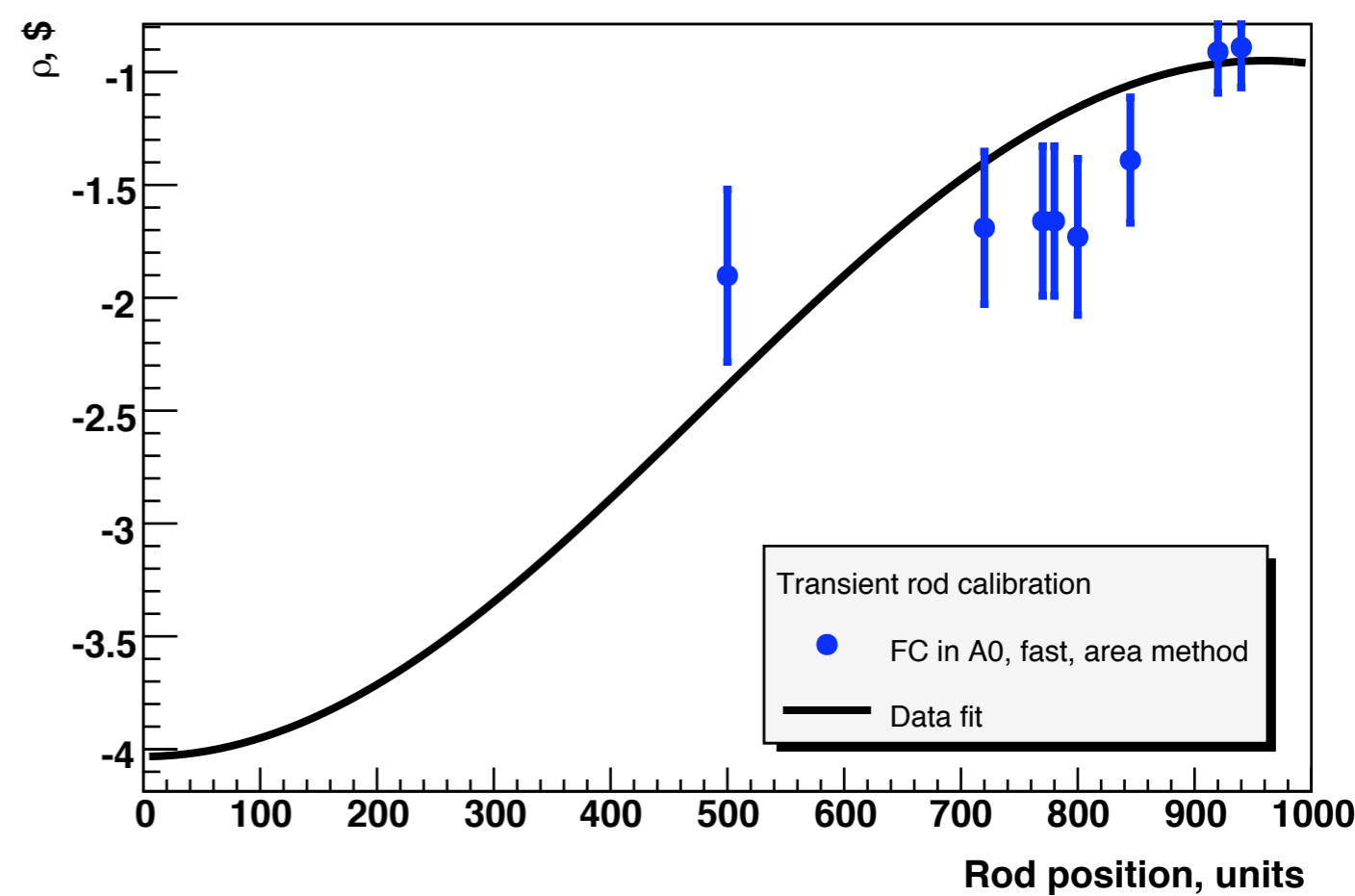
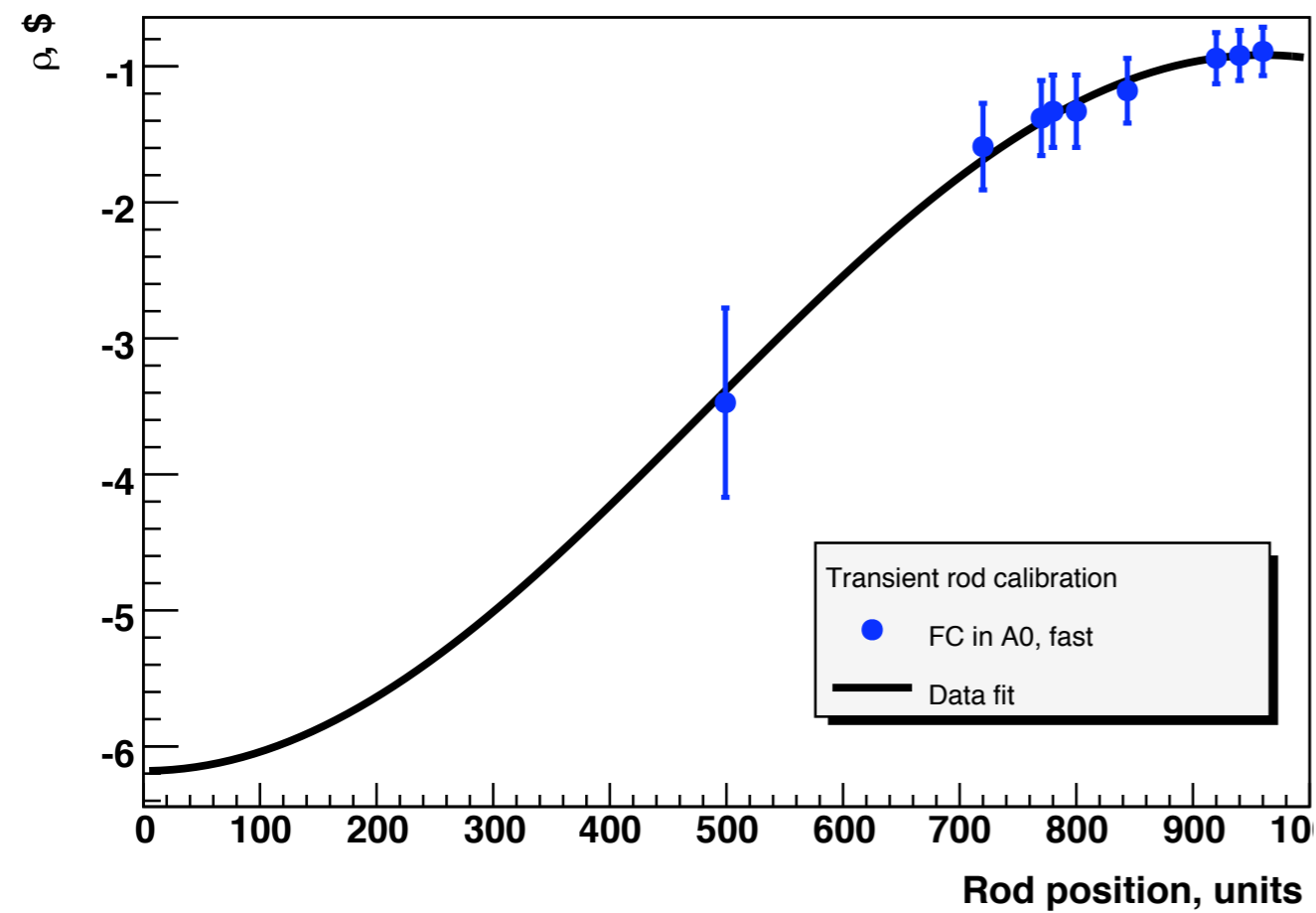


Fast pre-amp recovers within $50 \mu\text{s}$



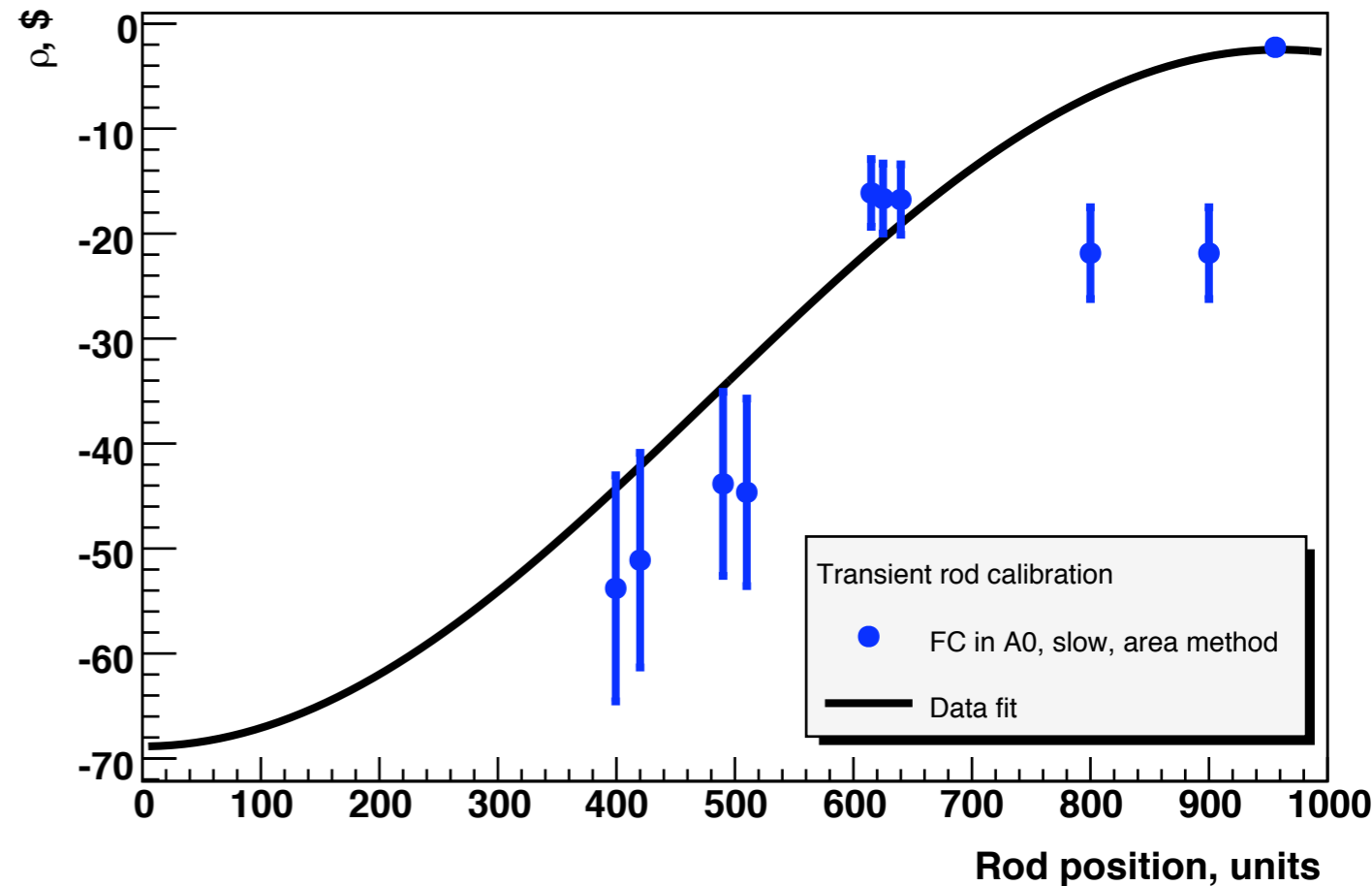
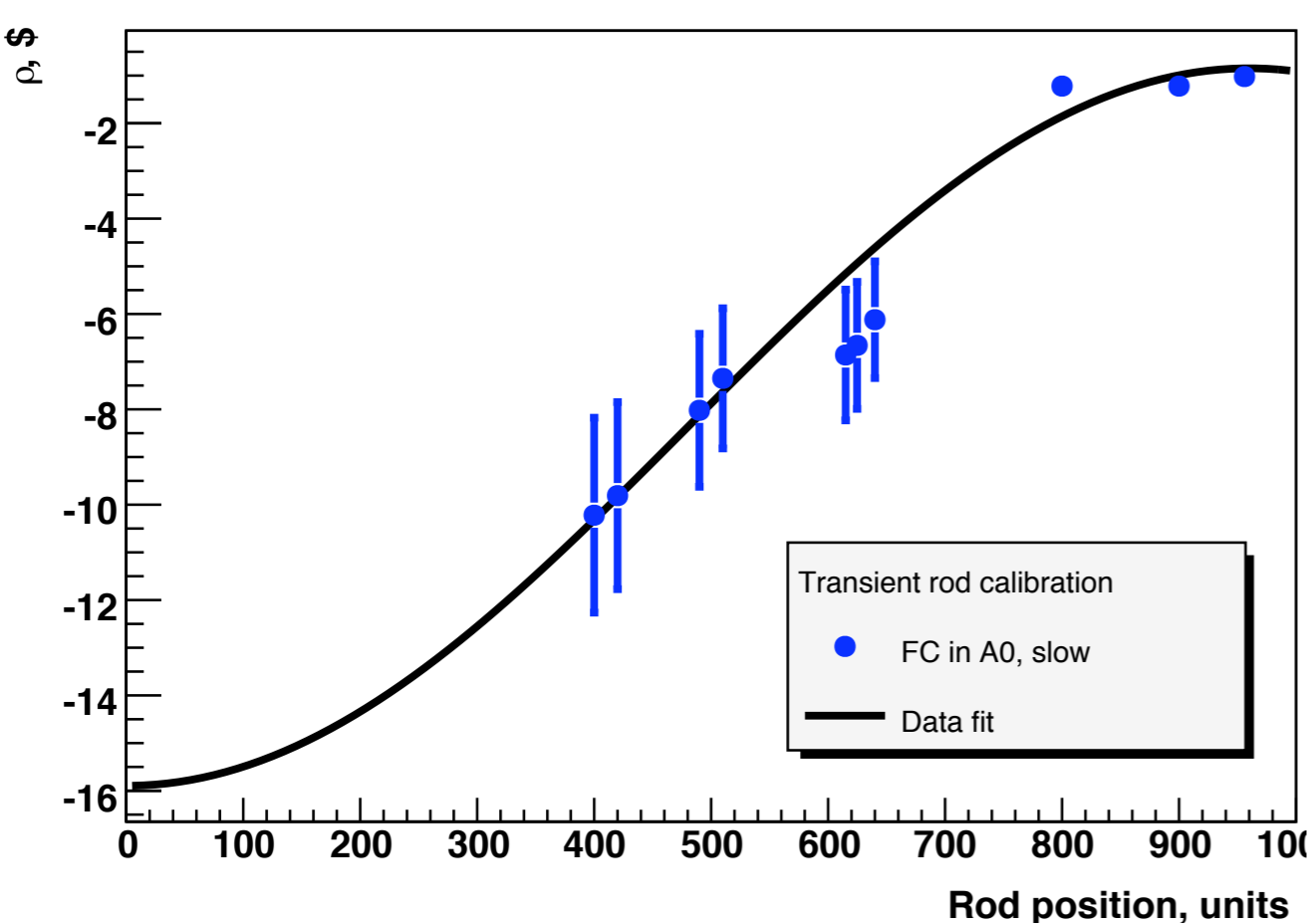
Pre-amps with time constant $\sim 100 \mu\text{s}$ overloaded $\sim 2 \text{ ms}$

Fit and Area methods I



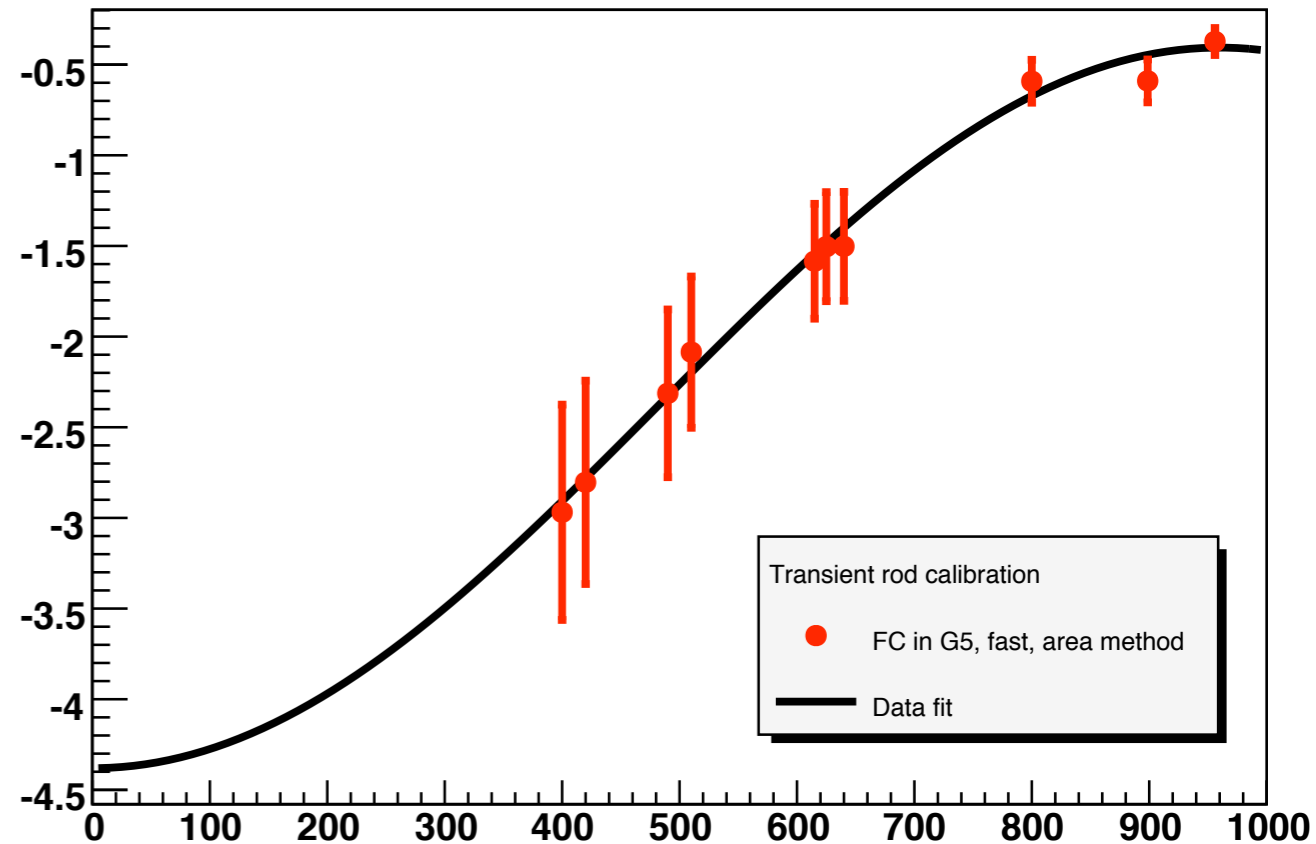
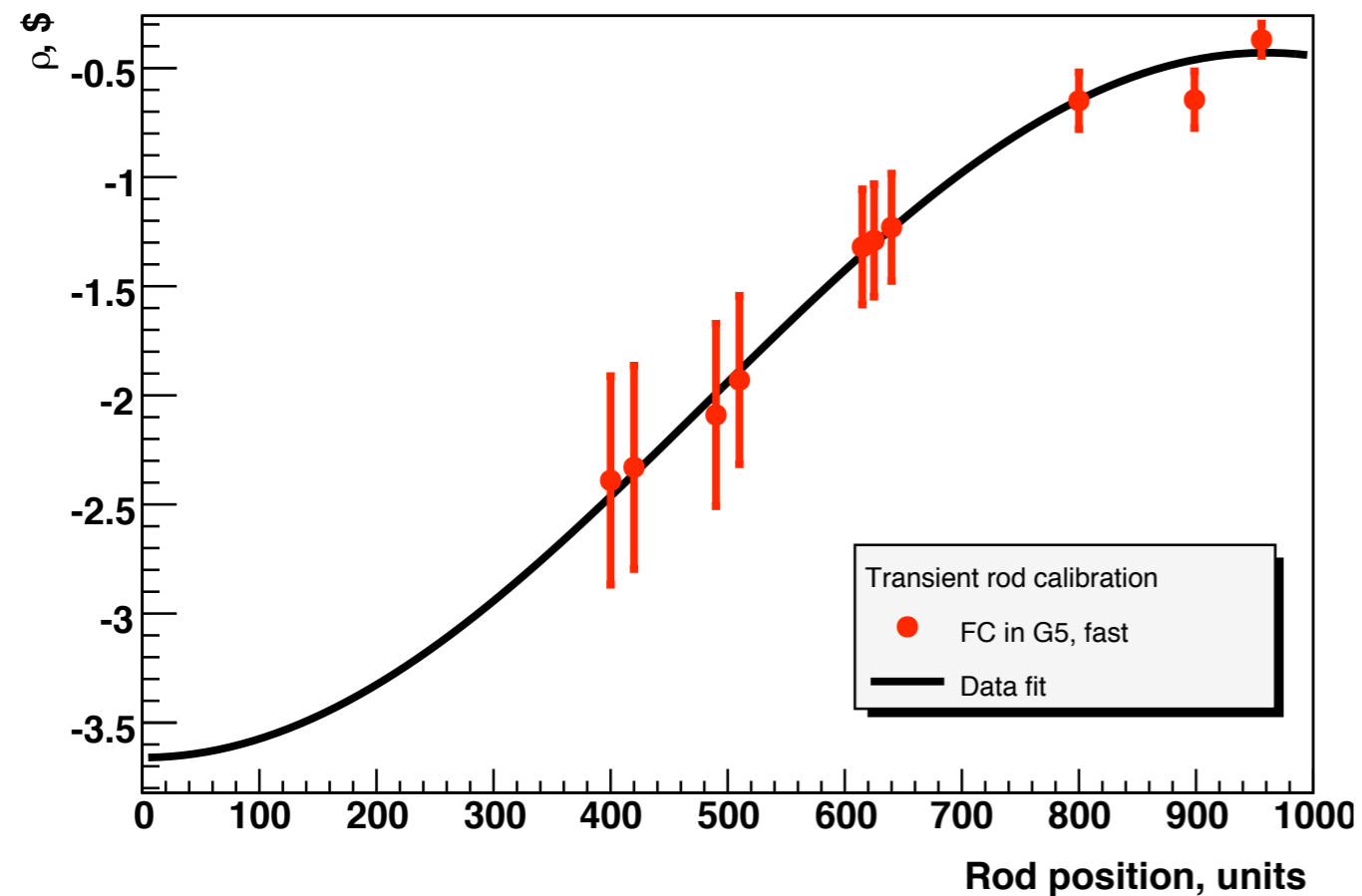
FC at core center (A0). Fast pre-amp.

Fit and Area methods 2



FC at core center (A0), again. Slow pre-amp. Much more scatter of data points, not as consistent with area method.

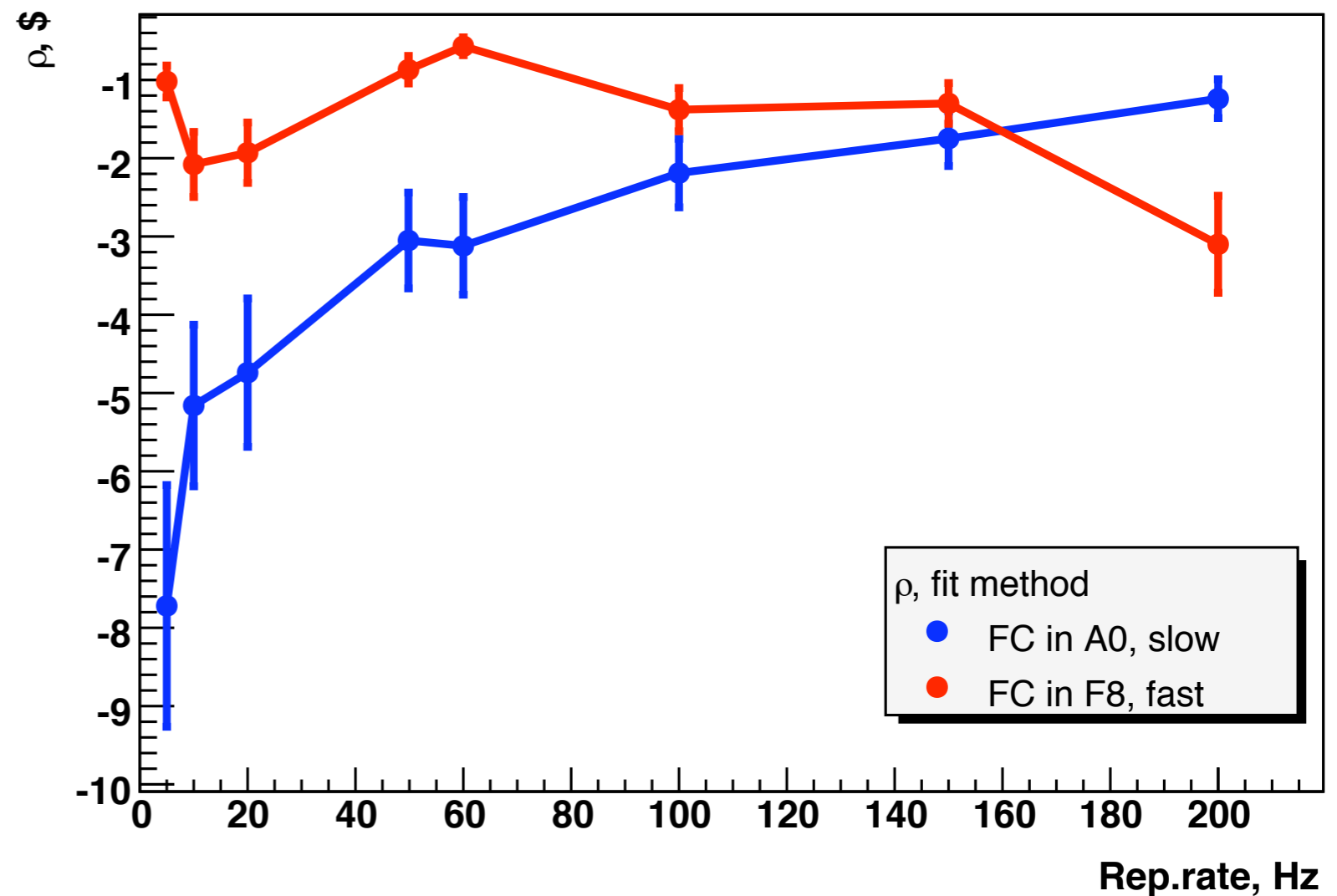
Fit and Area methods 3



FC at core edge (G5). Fast pre-amp. Both methods provide similar results.

Linac repetition rate dependence

- Too much of distortion with the slow pre-amp (blue)
- Fast pre-amp: consistent data (correct ρ , independent on rate)
- Possible bias due to buildup of DN



Issues

- Slope fit method: which part to fit?
Compare to MCNP neutron propagation?
Correct β and Λ values?
- Fast pre-amp — more reliable area method
- FC too efficient? The two methods at the core edge are most consistent
- Compare with current data (Sean)
- Need to confirm that measurements are independent on linac rep. rate and time

Results

- If measurements with fast pre-amps are confirmed, gamma-flash might not be a problem: fast recovery, area method is OK
- Can measure reactivity changes of ~ 0.1 \$ using fit and area methods