52 homework: beam diagnostic resolution necessary to check the energy and phase stability of the system to determine if this is a practical test.

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### From RTML RDR:

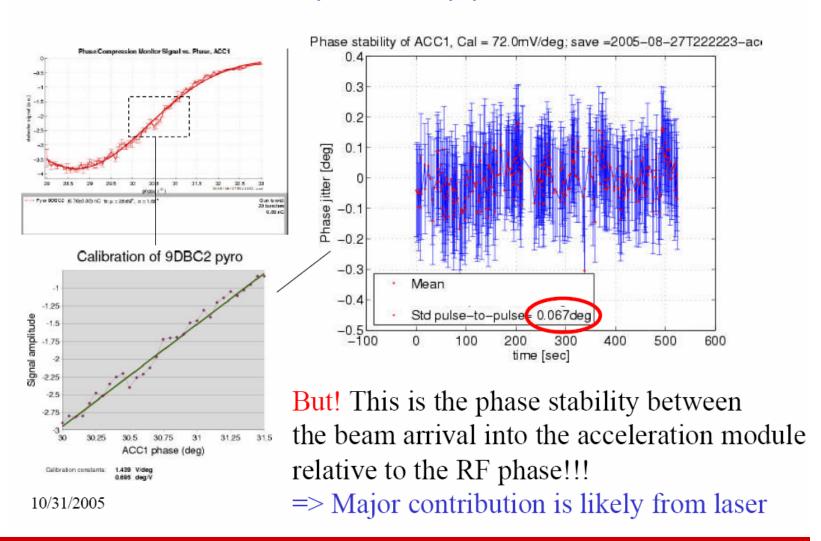
- Phase stability tolerance: 0.25 degrees rms at 1.3
  GHz
- Amplitude stability tolerance: 0.5% rms
- Bunch compressors operate close to zero-crossing (0-40 degrees)

### Bunch launch jitter because of laser

- At Fermilab A0: laser timing jitter WRT master oscillator is 0.2 ps rms (0.1 degee @ 1.3 GHz)
- At TTF (probably) 0.1 ps rms

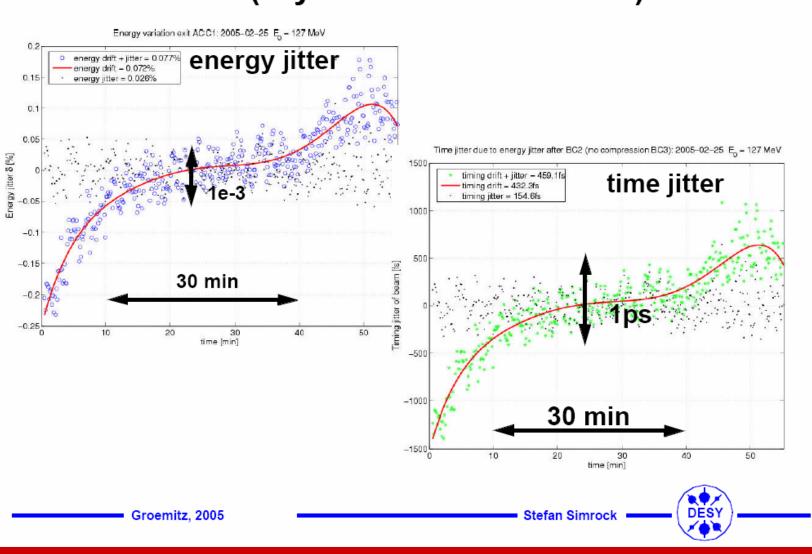
### Bunch phase stability measurements at TTF (from Simrock)

# Phase stability with pyro-detector



## Long-term tests

# Drift ACC1 (cryomodule before BC) at TTF



#### Conclusions

- Diagnostics for single bunch phase stability measurements already exist at TTF.
- For 3000 bunches -- needs development.
- Amplitude stability measurements can be done with BMPs and a dipole magnet (energy spectrometer)
  - ➤ Dispersion 1-2 meters easily achievable. For 0.5% energy error, BPM resolution does not need to be better than 100um.