

EIC interest from the University of Kansas

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University of Kansas, Lawrence
EIC meeting



February 3 2021

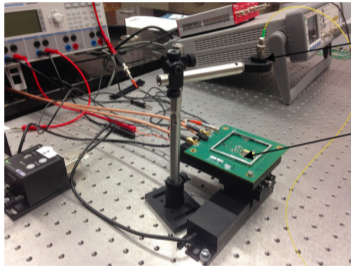
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Interest for the EIC

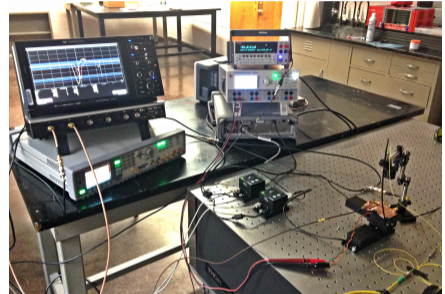
- The KU group has a strong involvement in the heavy ion program: Michael Murray, Steve Sanders, Christophe Royon (CMS), Daniel Tapia Takaki (Alice) as tenure, one of the largest group in CMS-heavy ion, funded by DOE Nuclear Physics
- Strong interest in flow studies, high gluon density regime and saturation, heavy quark and top physics (3 post-docs, 7 students)
- The group intends to have active contributions at the EIC, both from the physics and hardware point of view
- Hardware experince: Mostly on Ultra-fast Si detectors for CMS high lumi upgrade (HEP and Nucler Physics: Chris Rogan and Christophe Royon, and applications (medical and NASA)

Test stand at the University of Kansas



Pulsed NIR PiLa

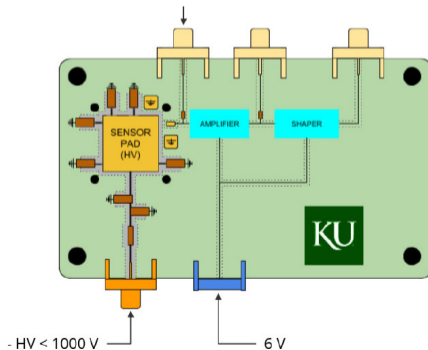
Amplifier with the
CTTPS sensor



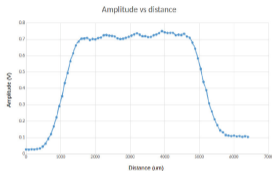
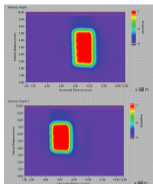
- Full test stand installed at the University of Kansas: readout of a Si detector
- Using laser or radioactive source in front of the detector

Performance with a real Ultra Fast Silicon detector

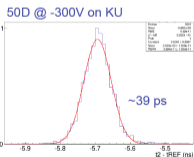
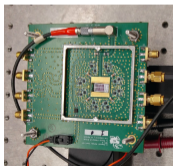
- The output signal of the Ultra Fast Si Detector is amplified before going into the readout electronics
- Design of a new multi-purpose electronics board for testing, many different applications, and lower cost compared to commercially available solutions (patent in progress)



Test stand at the University of Kansas

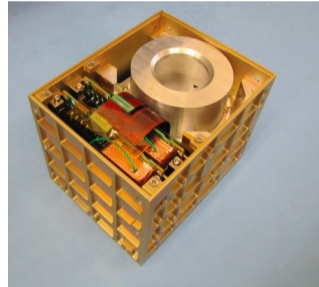


- Visualize pixels from Si detectors: Pixel size: ~ 3 mm
- Test of Si timing detectors at Fermilab: Timing resolution per layer of Si detector: ~ 39 ps



Medical and NASA projects

- Analysis of cosmic ray particles: Use different sizes of Si detector that can be sensitive to the kinds of particles that are produced
- Analyze the signal using fast digitization: measure energy and type of particles
- First measurements of doses in high intensity beam cancer treatment: see <https://arxiv.org/abs/2101.07134>



KU participation to the EIC

- Participation in all tests of UFSDs
- Participation in development/tests of readout electronics using the lab available at KU: includes laser/radioactive sources, temperature controlled chamber, etc., engineers available at KU.
- Participation in beam tests, and installation at BNL
- Of course depends on available funding: no funding now for EIC activities (material and personel)

