Technology Transfer Workshop

Opportunities with Detector Technologies in Nuclear Physics

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What is Technology Transfer

- Moving “non-profit” developed innovations to (usually) the “for-profit” sector
- From:
  - Universities
  - Research facilities
  - Hospitals
  - Government labs
- To:
  - Commercial companies
  - Other non-profits

Enabling Technology Transfer

- Bayh-Dole Act of 1980
  - Federal Legislation that applies to all federally-funded programs
- Permits all non-profits to retain title to inventions made in the performance of federally-funded programs
- Government gets a royalty-free non-exclusive license for government use
- Institution must share licensing revenues with inventors

Mission and Goals of the CUA Office of Technology Transfer

- The Office of Technology Transfer (OTT) assists the CUA faculty, staff, and students with the management and commercialization of their intellectual property.

- Protect the university
- Serve the faculty and staff
- Facilitate research
- Improve the human condition and contribute to public knowledge

OTT Operational Duties

- Manage the invention disclosure and patenting process to enhance the university's intellectual property portfolio
- Manage the relationships with companies that have licensed university technologies
- Find commercial partners and initiate license revenues for new technologies

Why Technology Transfer ?
Value to the University

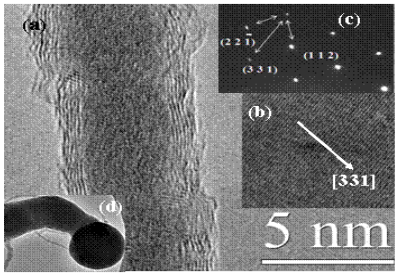
- Revenue stream from licensing
- Increased research funding and collaborations
- Increased visibility of university and researchers
- Stimulating research and an entrepreneurial environment among faculty

Vitreous State Laboratory

- Established in 1968
- Interdisciplinary R&D program
  focusing on applied materials science
  & glass chemistry and physics
- Approximately 70 staff
  - Ph.Ds in chemistry, physics, chemical engineering, radiochemistry, materials science, glass science, metallurgy, geology, geochemistry, electrical engineering, biophysics
  - Dedicated round-the-clock pilot plant operations staff
- Modern 55,000 ft^2 facility
- Licensed for radioactive and hazardous materials
- Extensive chemical, physical, and materials characterization and pilot-scale testing facilities

VSL Principal Current R&D Areas

- Nuclear and hazardous waste stabilization
- Glass and ceramic materials development
- Materials corrosion and characterization
- Off-gas treatment
- Water treatment
- Cements, flyash
- Geopolymers
- Biophysics
- Nano-materials
- Thermoelectrics
- Spintronics
- Detector materials



Nuclear Physics at CUA

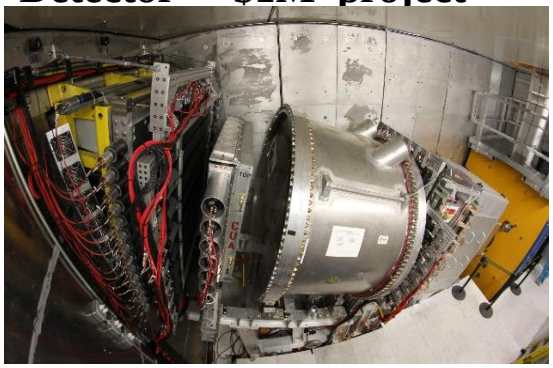
- Exploring the origin and structure of atomic nuclei in terms of the quarks and gluons
  - ❑ Active science program at Jefferson Lab 12 GeV
  - ❑ Leaders of international collaborations building particle detectors
    - Aerogel Cherenkov – pion/kaon/proton identification
    - Electromagnetic Calorimeter – photon and neutral pion detection
    - DIRC – kaon identification
  - ❑ Visibility of NP faculty in the community
    - CUA aerogel detector is a major highlight of a university being instrumental in developing particle detectors
    - CUA has the only mentors in the field who managed to have high school students be elected for the CEU
  - ❑ Active future science program with the Electron-Ion Collider (EIC)

Synergies between VSL capabilities and nuclear physics applications

- Detector construction is most often done on campus at CUA using the strong synergy between material science and particle detection techniques
  - Material optical and chemical composition analysis
  - Material radiation resistance
  - Thermal treatment
  - New material formation
  - Excellent opportunity to engage students in research

Recent Detector Projects at CUA

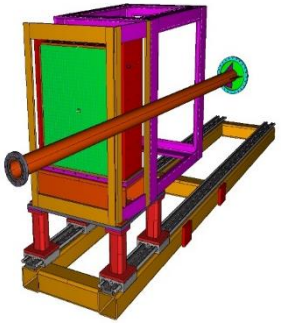
SHMS Aerogel Cherenkov Detector - ~$1M project

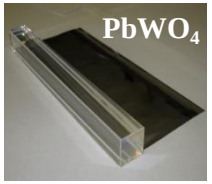


2014 construction completed

Supported by NSF PHY-1039446

Neutral Particle Spectrometer - ~$2M project





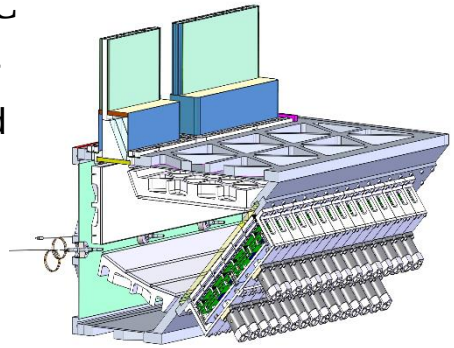
+Compact Photon Source (coming soon)

2016-present construction ongoing

Supported by NSF PHY-1530874

Gluex DIRC

2017 first bar box delivered frame installed, completion date 2019



CUA faculty also involved in future EIC detector design

- Electromagnetic calorimeter and DIRC
- ***News:*** CUA hosts the 2018 EIC UG Workshop 30 July – 3 August

Today's Workshop

- Tanja Horn – CUA Nuclear Physics
- Thia Keppel – Jefferson Lab Hall A/C leader
- Carlos Munoz-Camacho – IPN Orsay/France
- Ian Pegg – Director Vitreous State Laboratory, CUA Material Science
- Drew Weisenberger – Jefferson Lab Chief Technology Officer and leader of the detector and imaging group

Goals for Workshop

- Evaluate opportunities for technology transfer and new synergies with, e.g. universities
- Evaluate opportunities for small business funding
- Discuss technologies of relevance for Jefferson Lab and universities
  - Imaging and Detectors
  - Materials & Detectors and novel applications
  - Software and Data Acquisition
- Discuss path forward for Lab/University/Business collaborations