

# Update from the Edwards Accelerator Lab at Ohio University

Carl R. Brune

Ohio University, Athens, Ohio

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Facilities, Detectors & Upgrades Working Group  
NSAC Long Range Plan Town Hall meeting on  
Nuclear Structure, Reactions and Astrophysics

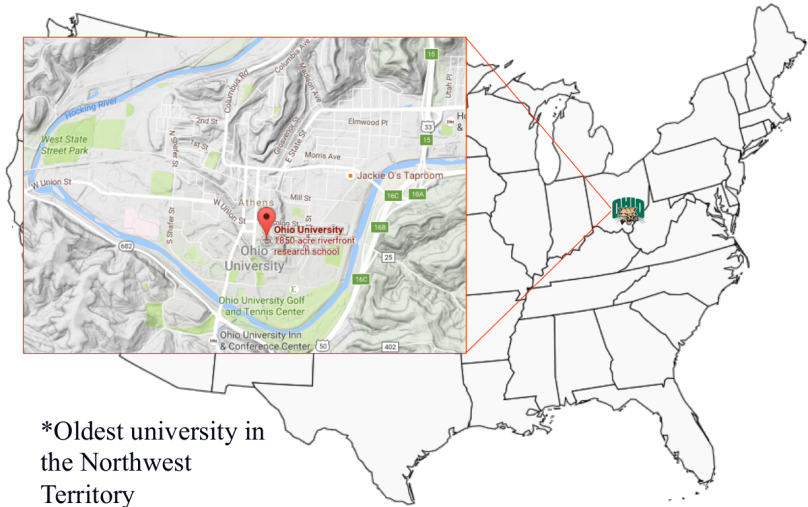
DE-FG02-88ER40387, DE-NA0004065



Association for Research  
at University Nuclear Accelerators

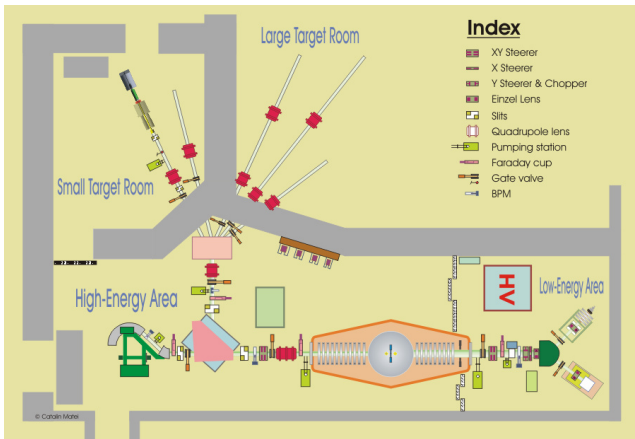


# Ohio University: “Riverfront Research School”



\*Oldest university in  
the Northwest  
Territory

# Edwards Accelerator Laboratory



- ▶ 4.5-MV Tandem Accelerator – **Just celebrated 50 years!**
- ▶ Pelletron charging system, upgraded to Alphasource He ion source
- ▶ Unique beam swinger and 30-m TOF tunnel
- ▶ Specializations: TOF techniques, neutrons
- ▶ <http://inpp.ohio.edu/~oual/>



Association for Research  
at University Nuclear Accelerators



# People

## **Faculty and Research Staff**

- ▶ Carl R. Brune
- ▶ Steven M. Grimes
- ▶ Thomas N. Massey
- ▶ David Ingram
- ▶ Alexander Voinov

## **Technical Staff**

- ▶ Don Carter
- ▶ Greg LeBlanc

## **Graduate Students**

- ▶ Bikash Chauhan
- ▶ Joseph Derkin
- ▶ Michael Jeswald
- ▶ Yenuel Jones-Alberty
- ▶ Chirag Rathi
- ▶ Nisha Singh
- ▶ Justin Warren

## **Undergraduate Students**

- ▶ Greta Hibbard
- ▶ Casey Ann Horvath
- ▶ Airton McGrath

# Recent / ongoing / future projects in the lab

## Completed:

- ▶ New neutron source beamline: FAST.
- ▶ New Alphasource He ion source (NSF MRI).

## In progress:

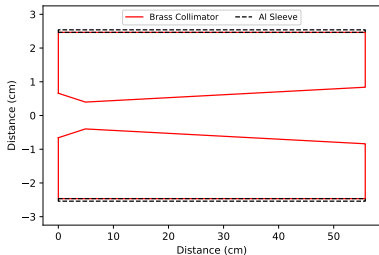
- ▶ Si array for swinger (neutron – charged-particle coincidences).
- ▶ Refurbishment / replacement of chilled water system and large magnet power supplies.

## Future:

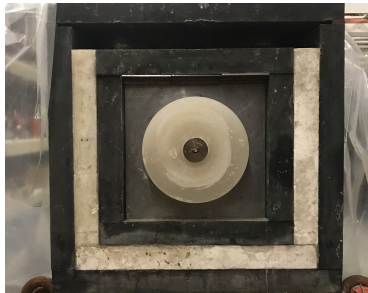
- ▶ Replace existing Cs sputter source with a new NEC SNICS II source.

# New Neutron Source: FAST

- ▶ The beam swinger and TOF tunnel at Ohio are excellent, but do not allow source-sample distances between 0.14 and 3.8 m.
- ▶ Solution: **Fixed Angle Short T**rajectory = **FAST** neutron source.
- ▶ Located in large target room, where space is plentiful.
- ▶ The angle is fixed at  $0^\circ$  and source-sample distances down to 0.6 m are possible.
- ▶ Can utilize all of our standard source reactions.
- ▶ Initial physics goal: study of  $^{16}\text{O}(n, n)$  resonances related to  $^{13}\text{C}(\alpha, n)^{16}\text{O}$ .



Details of inner brass collimation.



The FAST collimation system.  
Ph.D. project of Joseph Derkin.

## Recent accomplishments

- ▶  $^{13}\text{C}(\alpha, n)$ ,  $^{27}\text{Al}(\alpha, n)$   $^{96}\text{Zr}(\alpha, n)$   
K. Brandenburg *et al.*, Nucl. Sci. Eng.; G. Hamad *et al.*, Phys. Rev. C 106, 025804 (2022).
- ▶  $^{12}\text{C}(n, n')3\alpha$ , nuclear astrophysics, TAMU, Wash-U, . . .  
J. Bishop *et al.*, Nature Communications 13, 2151 (2022).
- ▶  $^{13}\text{C}(n, 2n\gamma)^{12}\text{C}$   $E_n = 15$  MeV, ICF diagnostic  
A. M. McEvoy *et al.*, PRC 103, 064607, 8 pages (2021).
- ▶ Neutron detector characterizations: FSU, UT, ORNL, . . .
- ▶ Neutron imaging, novel detectors: LLNL, UT, OSU, . . .

Thank you for your attention.

And thanks to our many collaborators and the funding sources for making this all possible!



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