Welcome to the newsletter for SECAR, a next-generation recoil separator optimized for direct measurements of astrophysical capture reactions with radioactive beams. Here you will find the latest updates on the SECAR project and its use for exciting nuclear astrophysics research at NSCL and FRIB!

**Installation Progress** Significant progress has been made on the installation of SECAR components in the ReA3 hall. Installation of the target system and accompanying BGO detector array are complete, as is the installation of the focal plane system. All the dipole and multipole magnets are in place, aligned, and instrumented. Installation of the separator controls continues, as does fabrication and installation of the system diagnostics. A significant project milestone was the installation of the upstream velocity filter, one of two that form the core elements for rejecting unreacted beam particles in SECAR. The image below shows the velocity filter high voltage chamber, including the critical high voltage plates that provide the horizontal electric field. The figures at right show this chamber within the magnet (top) that provides the vertical magnetic field in this crossed-field device, and the final installation in the ReA3 hall (bottom). We received both HV power supplies for the upstream velocity filter and their installation is being completed.

Beam line installation beyond FP2 and installation of the associated diagnostics are progressing according to plan. The next page gives details on our early commissioning activities that are currently in progress.
Early Commissioning While commissioning of the complete SECAR system will begin in 2020, we are currently commissioning the sections of the system that have already been installed and instrumented. This approach is enabling us to determine as early as possible the effectiveness of SECAR diagnostics and controls. Successes to date in the commissioning work include: beam line and associated diagnostics commissioned up to Focal Plane 2 (FP2); beam shape and size at FP2 (see image, approximately 2mm wide x 4mm tall) shown consistent with ion optical calculations; first magnet calibration data point taken for dipoles B1 and B2 using a resonance in proton capture on $^{27}$Al + p resonances; transmission measured from target to FP1; first use of the SECAR BGO array; and development of an efficient and reproducible tuning procedure to transport the beam along the ion optical axis to FP2. For the dipole calibrations, we bombard a solid aluminum target with a proton beam and measure a thick-target yield of the capture $\gamma$-rays using the SECAR BGO array. We use the $^{27}$Al(p,$\gamma$) resonances as an independent beam energy determination, enabling the energy vs. field calibration of the dipoles when using the new beam tuning procedure to center the beam. Additional resonances will be measured with the same method in a forthcoming commissioning beam time.

Planning for Experiments Proposals for beam time at NSCL during the transition to FRIB are currently being accepted in advance of a special meeting of the NSCL Program Advisory Committee. We expect SECAR to be completed and available for experiments during this time. Experiments will use ReA3 in stand alone mode with stable or long-lived unstable beams (with half life longer than 6 days). The deadline for proposal submission is January 9, 2020, and the ReA-PAC meeting will be held March 3-4, 2020. The list of available beams is available online at https://nscl.msu.edu/users/beams.html. To request a beam that is not on the list, please contact the Manager for User Relations, Jill Berryman, prior to November 25, 2019. The requested beams will be reviewed for feasibility and then possibly added to the website. A webinar with details on this process can be found online at https://fribusers.org/news.html#webinar2019. Due to the anticipated significant beamtime needed to commission SECAR, the facility has requested that our collaboration submit a proposal for commissioning. Please let us know if you are interested in contributing to the planning of this proposal.

Additionally, FRIB will be hosting a hands-on workshop to support the preparation of proposals for consideration by the first FRIB Program Advisory Committee. The "FRIB First Experiments: Proposal Preparation" workshop will take place from May 4 - 8, 2020 at FRIB in East Lansing, MI. A website has been set up at https://indico.frib.msu.edu/event/20/, and more details will be added as they become available.

New Members are Welcome! SECAR is an open collaboration and we invite new members to join at any time. Since commissioning is underway, this is a particularly good time to join, and also a great time to get in on the experiments we are planning for 2020 – 2021. There are also numerous projects for students and postdocs emerging, some of which could be carried out at remote sites. Please contact Hendrik Schatz (schatz@nscl.msu.edu) or Michael Smith (smithms@ornl.gov) to get started!