Beams and Applications Seminar Series

This ANL seminar series focuses on the physics, technology and applications of particle and photon beams. It is sponsored jointly by the ASD Division, the AWA group of the HEP Division, and the ATLAS group of the PHY Division

Bldg. 203, Room R150
Tuesday, May 21, 1:30 PM
(note special day and location)

Thomas Wangler (LANL)

Beam Halo Formation in High Current Mismatched Proton Beams

Host:P. Ostroumov

During the past year at Los Alamos we have carried out an experiment to measure the formation of transverse beam halo in mismatched proton beams in a 52-quadrupole FODO-transport channel following the 6.7-MeV RFQ at the Low Energy Demonstration Accelerator (LEDA). Beam profiles in both transverse planes were measured using a new diagnostic device that consists of a movable carbon filament for measurement of the beam core, and scraper plates for measurement of the outer part of the distributions. Our results indicate a surprisingly strong growth rate of the rms emittance even for the modest space-charge tune depressions of the experiment. Our results are consistent with complete transfer of free energy of the mismatched beams into emittance growth within 10 envelope oscillations for both the breathing and the quadrupole modes. We find that mismatch emittance growth is not easy to predict accurately from simulations made prior to measurements, because it depends on beam properties that are usually not known in advance, such as the tails present in the input distribution, and on anisotropy between the input x and y distributions.

For more information visit

http://www.aps.anl.gov/asd/physics/seminar.html

Visitors from off-site please contact the Accelerator System Division office (konopa@aps.anl.gov, 630-252-3115) to arrange for a gate pass.