Nuclear reaction modeling for RIA ISOL target design

M.B. Chadwick and D.J. Vieira
Los Alamos National Laboratory, Los Alamos, NM 87545, USA

Los Alamos scientists are collaborating with researchers at Argonne and Oak Ridge on the development of improved nuclear reaction physics for modeling radionuclide production in ISOL targets. This is being done in the context of the MCNPX simulation code, which is a merger of MCNP and the LAHET intranuclear cascade code, and simulates both nuclear reaction cross sections and radiation transport in the target. The CINDER code is also used to calculate the time-dependent nuclear decays for estimating induced radioactivities. We will give an overview of the reaction physics improvements we are addressing, including intranuclear cascade (INC) physics, where recent high-quality inverse-kinematics residue data from GSI have led to INC spallation and fission model improvements; and preequilibrium reactions important in modeling (p, xn) and $(p, xnyp)$ cross sections for the production of nuclides far from stability.