

## **ADIABATIC RESONANCE CROSSING FOR ACCELERATOR PRODUCTION OF NEUTRON-RICH RADIOISOTOPES**

S. Buono, G. Ber, P. Dasse, H. Fessi, Y. Kadi, L. Maciocco, H. Mehier, L. Zanini.

Adiabatic Resonance Crossing (ARC) has been proposed by Nobel laureate Carlo Rubbia as a new method to enhance neutron capture for the activation of radioisotopes for medical and industrial applications. The ARC method, which was developed at the European Organization for Nuclear Research (CERN), allows using the neutrons produced with an accelerator target as an efficient radioisotope-production alternative to the use of nuclear reactors. The ARC method, when coupled with high power targets (hundreds of kW), can be competitive to a reactor production. When coupled with small "industrial" cyclotrons, can instead be used to produce therapeutic doses of radioelements suitable for brachytherapy, such as Rhenium, Holmium and Lutetium. Such elements are activated directly into ferrite nanospheres mixed into a sterile liquid solution, which is efficiently injected into large non-operable tumors with the help of implanted perforated microtubes.