Contribution ID: **62** Type: **poster with financial aid**

Fast neutron converter for light RIB production with 5 MeV deuterons beam of SARAF phase I

Intense neutron sources based on high current deuterons impinging a thick beryllium, lithium or carbon targets are the basis for most of SARAF (Soreq, Israel) and SPIRAL2 (GANIL, France) future applications. Both facilities will use a 40 MeV and few mA of deuterons, resulting with ˜10ˆ15 fast n/sec sources.
SARAF phase I linear accelerator consists of a RFQ and one superconducting module. During the 2009 commissioning, the linac delivered high power proton beams and accelerated deuterons. By the end of 2010 a high power 5 MeV deuteron beam is expected to be available for limited experiments.
This relatively low energy beam can already produce an intense fast neutron source. The spectra and total yield of fast neutrons depend on the choice of the converter material. We found that a target made from LiF maximizes the energy and yield of fast neutrons, and is also capable of holding ˜10 kW beam power.
We introduce the concept of LiFTiT - LiF Thick Target, thermally coupled to a micro-channel water cooled copper backing. Simulations suggest a total yield of 1013 fast n/sec with neutron energies of up to 20 MeV. The high neutron yield and spectral similarity makes LiFTiT a good experimental tool for verifying isotope production schemes planned for SARAF phase II or SPIRAL2.
We present a unique experiment of 8Li production and extraction using fast neutrons from LiFTiT. The secondary production target is a 65% porous B4C in which 8Li is produced via the 11B(n,a)8Li reaction channel. The B4C target will be mounted inside a high temperature furnace for fast extraction of the short-lived isotopes. According to simulations, up to 10ˆ9 8Li/sec are expected in this experiment.
As a results of this proposed experiment at SARAF-I, better production and extraction schemes of light RIB, of great interest in various nuclear and astrophysics related measurements, may become possible .

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