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## Recent Work

### **Title**

Neutron beam filtering assembly for the LBNL BNCT Facility

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### **Author**

Bleuel, D.L.

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**Neutron Beam Filtering Assembly for the LBNL BNCT Facility\***

D.L. Bleuel, W.T. Chu, R.J. Donahue, B.A. Ludewigt, R.J. McDonald, A.R. Smith, N.A. Stone, J. Vujic, Lawrence Berkeley National Laboratory and U.C. Berkeley, Berkeley 94720.

In preparation for future clinical BNCT trials, neutron production via the  ${}^7\text{Li}(p,n)$  reaction as well as subsequent moderation to produce epithermal neutrons have been studied. Proper design of a moderator and filter assembly is crucial in producing an optimal epithermal neutron spectrum for brain tumor treatments. Based on in-phantom figures-of-merit, desirable assemblies have been identified. Experiments were performed at LBNL's 88" cyclotron to characterize epithermal neutron beams created using several microamperes of 2.5 MeV protons on a lithium target. The neutron moderating assembly consisted of Al/AlF<sub>3</sub> and Teflon, with a lead reflector to produce an epithermal spectrum strongly peaked at 10-20 keV. The thermal neutron fluence was measured as a function of depth in a cubic lucite head phantom by neutron activation in gold foils and portions of the neutron spectrum were measured by in-air activation of six cadmium-covered materials (Au, Mn, In, Cu, Co, W) with high epithermal neutron absorption resonances. The results were compared to those obtained in Monte Carlo computational models.

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