

Wednesday

Mar. 8th

At 3:30pm



Inelastic Neutron Scattering - From Baghdad to Berkeley

Abstract:

Inelastic scattering of “fast” ($100 \text{ keV} < E_n < 10 \text{ MeV}$) neutrons is at the core of nuclear energy systems, radiation shielding calculations and non-proliferation applications. Recently *Bauge* has shown that elastic and inelastic neutron scattering is now the dominant source of uncertainty in important parts of the benchmarking process used in nuclear reaction evaluation¹. In addition to its importance to applications, $(n, n'\gamma)$ in this energy range provides an unbiased probe into both discrete and quasi-continuum nuclear structure since reaction proceeds through both direct and compound nucleus formation.

The most comprehensive compendium of $(n, n'\gamma)$ data is the “Atlas of γ -ray spectra from the inelastic scattering of reactor fast neutrons”, aka the “Baghdad atlas” from A.M. Demidov *et al.*², using the IRT-5000 reactor at the Al-Tuwaitha research facility in Iraq. The atlas contains over 7376 lines from $(n, n'\gamma)$ on 76 elemental targets ranging from Be to U taken with the same calibrated detector system over the course of thousands of hours of run time. While the reactor was “decommissioned” during the first gulf war in 1991, a copy of the Atlas survived, and the nuclear data (BAND) group in Berkeley has taken the lead in compiling the information into a database. In this talk I will discuss our work compiling the Baghdad atlas data, and describe our complementary neutron and charged-particle measurement program using a variety of neutron sources on the UC campus and the LBNL 88-Inch cyclotron designed to address the deficiencies neutron scattering data.

CYCLOTRON COLLOQUIUM

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Room 228

Refreshments will be
served at 3:15pm



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