

## FAST-NEUTRON SCATTERING FROM VIBRATIONAL PALLADIUM NUCLEI

by

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ABSTRACT

Neutron total cross sections of elemental palladium are measured from  $\approx 0.6 \rightarrow 4.5$  MeV. These results, combined with others previously reported from this laboratory, provide a detailed knowledge of the neutron total cross sections of palladium from  $\approx 0.1 \rightarrow 20$  MeV. Differential neutron elastic-scattering cross sections are measured from  $\approx 1.5 \rightarrow 10$  MeV in sufficient energy and angle detail to well define the energy-average behavior. Concurrently, neutron inelastic-scattering cross sections are measured from  $\approx 1.5 \rightarrow 8$  MeV. Inelastically-scattered neutron groups are observed corresponding to excitations of;  $306 \pm 14$ ,  $411 \pm 47$ ,  $\approx 494$ ,  $791 \pm 20$ ,  $924 \pm 20$ ,  $1156 \pm 24$ ,  $1358 \pm 35$ ,  $1554 \pm 47$  and  $1706 \pm 59$  keV, with additional tentative groups at 1938 and 2059 keV. Particular attention is given to the inelastic excitation of the  $2^+$  yrast states of the even isotopes. This broad data base is examined in the context of optical-statistical and coupled-channels models. The resulting model parameters are consistent with systematic trends in this vibrational mass region previously noted at this laboratory, and provide a suitable vehicle for many applications.