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Atomic X-Rays Associated with the Compound-Nucleus^{††}
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The characteristic X rays of the In compound nucleus formed in the reaction $^{106}\text{Cd} + p$ at 12 MeV and 10 MeV incident energies have been observed.¹ It is demonstrated that the In X rays are associated with the decay of atomic vacancies, created on the way into the collision, during the time of the compound nucleus formation. The intensity of the In K X rays measured in coincidence with the charged reaction products are connected to the mean compound nucleus lifetime, t , through a formula first given by Gugelot.² The deduced values of t are compared with the predictions given by the statistical model of nuclear reactions. The value of the ionization probability, I , entering in the formula is discussed on the basis of an analysis of the K-shell ionization probability of ^{88}Sr measured on and off the resonance at 5060 keV in the reaction $^{88}\text{Sr}(p, p_0)^{88}\text{Sr}$.³ The theoretical values of the real part and imaginary part of the ionization amplitude used in the calculations are found to give a reasonable agreement with the experimental I values of the Sr K-shell. Possible extensions of this method to compound nucleus lifetimes formed in heavy ion collisions are discussed.

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¹J.F. Chemin et al, Nucl. Phys. A 331, 407 (1979).

²P.C. Gugelot, In Direct Interaction and Nuclear Reaction Mechanisms, Padua, E. Clementel and C. Willis, Eds. (Gordon and Breach, New-York, 1962) p. 382.

³J.F. Chemin, R. Anholt, C. Stoller, W.E. Meyerhof, To be published.