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**Wave nature of the deuterium flux permeating palladium thin film** XING Z. LI, BIN LIU, QING M. WEI, Department of Physics, Tsinghua University, China — In the past 20 year research on Condensed matter Nuclear Science, the deuterium flux permeating palladium has been found correlated with the “excess heat”<sup>1</sup>. An experiment was conducted to reveal the wave nature of the deuterium flux permeating Pd thin film. at the temperature higher than the boiling point of the heavy water. The deuterium flux through Pd thin film was considered as a monotonic function of the thickness of the Pd film because the diffusion theory (Fick’s Law) was applied. Indeed the deuteron could not be treated as a granular particle at low energy. It should be treated as a wave, because its de Broglie wave length is comparable with the lattice constant of the Pd crystal (3.84 Anstrons). When the titanium carbide (TiC) thin layer was sputtered on the surface of the Pd substrate alternatively with Pd layers, we found that the flux might increase with the number of the layers first; then, it decreased after reaching a peak. which is the characteristics of a wave.

<sup>1</sup>J. Phys. D: Appl. Phys.36 3095(2003)

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