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Selective Resonant Tunneling through Coulomb Barrier by Confined Particles in Lattice X.Z. LI, Q.M. WEI, B. LIU, Department of Physics, Tsinghua University, Beijing 100084, China — In 1993, Kasagi discovered the anomalous yield of 3 deuteron fusion reaction while searching the branching ratio of d+d fusion at low energy. In 1995-1997, Takahashi carefully studied this anomalous yield of 3 deuteron fusion reaction again. Distinct from the early Kasagi's study, Takahashi studied another 3 deuteron fusion channel: i.e. d+d+d→ t (4.75MeV) + 3He (4.75MeV). Because only 2 nuclear products were emitted from this reaction channel, triton and helium-3 were clearly identified by their energy. From this information,Takahashi estimated the life-time of the 2 deuteron (2-d) resonance. It was in the order of 10^5 seconds. In this paper, selective resonant tunneling model was applied to calculate the life-time of this 2-d resonance inside the deuterated titanium. A square-well is assumed for the nuclear well, and a Coulomb repulsive potential is assumed for the long range interaction between two deuterons. The Coulomb potential is down shifted to include the electron- metal-screening. The lattice confined deuteron may bounce back and forth inside the lattice well. This may be called as the resonance which will greatly enhance the fusion reaction rate inside the nuclear well. An imaginary part of nuclear potential is introduced to describe this fusion rate.The calculated 2-d resonance lifetime, 10^5 seconds, agrees with Kasagi's and Takahashi's experimental data.

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