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## Enhancement of Neutrons Yield in dd Reactions within a TiD<sub>2</sub> Crystalline under Irradiation by a Deuterium Ion Beam

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At ion accelerators, the neutron yield is investigated in dd reactions within a TiD<sub>2</sub> crystalline under irradiation by a deuterium ion beam with the energy of less than 30 keV [1-8]. To study such reaction with an ultralow collision energy, there is a need in the information on the yield of neutrons in the reaction  $d(d,n)^3\text{He}$  versus the angular and spatial distribution of particles during the channeling process in thin crystals. The authors of [9] performed the computer simulation of the dd reaction in TiD<sub>2</sub> crystals and presented the results of computer simulations but they ignored the distribution of deuterons inside TiD<sub>2</sub> crystal. They presented trajectories and spatial distribution of the deuterium ions channeled in the (200) Ti crystal instead of the TiD<sub>2</sub> crystal. In our work we calculated the continuum potential of TiD<sub>2</sub> for two different structures of TiD<sub>2</sub>. The probability of increasing the yield of neutrons is studied depending on the energy, the angular and spatial distribution of the incident deuterons during the dd reaction in TiD<sub>2</sub> crystals, using computational modeling. The trajectories of deuterons in the crystal were modeled using our developed computer code with Mathematica. The results of the theoretical study concerning the effect of planar channeling of ultralow energy deuterons on the relative probability of dd-synthesis are in good agreement with the experimental data.

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