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Orientation Effect in $d(d,n)^3\text{He}$ Reaction Initiated by 20 keV Deuterons at Channeling in Textured CVD – Diamond Target

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In Ref. [1] the authors investigated the neutron yield in the $d(d,n)^3\text{He}$ reaction using textured CVD-Diamond and 20 keV deuteron beam from HELIS accelerator which delivers the deuteron beam with small angular and energy divergences. The authors of [1] suggested that the observed enhancement of neutron yield is connected both with the screening and channeling effects.

To clarify the role of channeling in enhancement of neutrons yield in $d(d,n)^3\text{He}$ reaction in CVD-Diamond crystal target, we present here the results of computer simulations. The deuterons trajectories in a CVD microcrystal are simulated using the computer code Basic Channeling with Mathematica™ (BCM-1) [2], which allows calculate angular and spatial distribution of channeled particles in a thin crystals, see e.g. [3]. The simple model to calculate the reaction yield revealed the remarkable orientation effect directly connected with flux-peaking of deuterons in a crystal. The comparison with experimental data [1] is performed.

References

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