Measurement of the $pd\mu$ fusion cycle parameters in the solid H/D mixture

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The final results of the μCF kinetics experimental study in solid hydrogen-deuterium mixtures (H/D) at temperature 3 K are presented. The experiment E742 has been carried out on the meson facility TRIUMF(Canada). Four exposures were performed at different deuterium concentration in H/D mixture: $c_d = 0.0005, 0.02, 0.15$ and 0.75. The simultaneous analysis of the measured time distributions of 5.5 MeV γ-quanta and 5.3 MeV conversion muons from nuclear fusion in $pd\mu$ molecule allowed to extract the values of the μCF chain parameters in H/D mixture: the fusion partial rates for different nuclear spin states of the $pd\mu$ molecule and the $pd\mu$ molecule formation rate. The experimental data fiting procedure has been done by two ways: using only the analytical formulaes described the kinetics of μCF processes in H/D mixture and the detailed Monte-Carlo simulation of the whole experiment. The results ($pd\mu$ formation rate; pd fusion rates in different nuclear spin states of $pd\mu$ molecule ($S = 1/2$; $S = 3/2$)) with gamma and conversion muon production obtained by these two methods are consistent with each other and confirm the existence of the Wolfenstein – Gershtein effect. There is a 20 - 30% difference between the final results and our previous data reported on the Ascona μCF Conference.