

Experience with polarized hydrogen molecular source.

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A novel source of polarized hydrogen and deuterium molecules has been tested [1]. The use of sextupole superconducting magnets allows us to select molecules with the nuclear spin projection -1 for hydrogen and -2 for deuterium. The measurements of the beam intensity of polarized hydrogen molecules have been performed for the nozzle temperature range of 6.5 - 30 K and a gas flow rate up to $5 \cdot 10^{-2}$ Torr_l/s. The flux of polarized hydrogen molecules injected into compression tube was found to be of $3 \cdot 10^{12}$ mol/s which is in a reasonable agreement with estimations. Flux of the focused deuterium molecules is lower, since the magnetic moments of deuterium molecules are much smaller than those of hydrogen molecules..

Further research will be aimed at obtaining of the optimal conditions for given separation magnet system to receive the higher intensity and understanding the process limiting the polarization and intensity of the beam. The nuclear polarization of the focused molecular beam will to be measured using the Lamb-shift polarimeter.

The obtained results will be used as a basis for the development of a high-intensity source of polarized molecules.

1. D.K.Toporkov *et al.* // Nucl. Instrum. Methods A 868 (2017) 15.