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Direction-sensitive dark matter search with three-dimensional gaseous tracking detector

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NEWAGE is a direction-sensitive direct dark matter search experiment with a three-dimensional gaseous tracking detector (micro-TPC). Our goals are detection of dark matter - nucleus scattering signal in the micro-TPC and investigation of the characteristics of the kinematics of dark matter in the Galaxy. Our direction-sensitive dark matter search by NEWAGE-0.3b'has been performed in Kamioka underground laboratory in Japan since Jul. 2013. A dark matter search experiment was performed from Jul. 2013 to Aug. 2016 (RUN14–17) with a total live time of 230.16 days which is about seven times larger than that of previous result (PTEP 2015, 043F01. DOI: 10.1093/ptep/ptv041). In the analysis, we improved the event selection and the background was reduced to 1/3 at 50 keV. In order to perform a direction-sensitive experiment with higher sensitivity, we also have studied a three-dimensional head-tail recognition of recoil nuclear tracks. This work is important to investigate the properties of dark matter in the Galaxy in the future dark matter research. We will present the latest results of NEWAGE with the three-dimensional head-tail recognition analysis, R&Ds and future prospects.

Primary author: YAKABE, Ryota (Kobe University)

Co-authors: MIUCHI, Kentaro (Kobe University); NAKAMURA, Kiseki (Kobe University); HASHIMOTO, Takashi (Kobe University); IKEDA, Tomonori (Kobe University); TAISHAKU, Ryosuke (Kobe University); NAKAZAWA, Miki (Kobe University); TANIMORI, Toru (Kyoto University); KUBO, Hidetoshi (Kyoto University); TAKADA, Atsushi (Kyoto University); SEKIYA, Hiroyuki (University of Tokyo); TAKEDA, Atsushi (University of Tokyo)

Presenter: YAKABE, Ryota (Kobe University)

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