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The impact of neutral impurity concentration on charge drift mobility in N-type Ge crystals[1] HAO MEI, GUOJIAN WANG, GANG YANG, DONGMING MEI, University of South Dakota — High-purity germanium crystals are being grown using the Czochralski technique at the University of South Dakota. The carrier concentration, mobility and resistivity are measured by Hall Effect system. We investigated the impact of neutral impurity concentration on charge drift mobility in N-type Ge crystals. Several samples with measured mobility lager than 35000 cmˆ2/Vs from the grown crystals were used for this investigation. With the measured mobility and the ionized impurity concentration, we were able to calculate the neutral impurity concentration by the Matthiessen's rule. The correlations between the neutral impurity concentrations with the radius of the crystals were studied. We report that the concentration of neutral impurity constrains charge draft mobility for N-type high-purity germanium crystals and the non-uniform distribution of neutral impurity could result in an anisotropy of draft time distribution in a given germanium detector.

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