The aim of this thesis is to investigate the effects of change in the chain length and chlorine group position on C–Cl bond photodissociation dynamics of chloroalkanes using the velocity map imaging (VMI) method. Three different chloroalkanes are studied (1-chloropropane, 2-chloropropane, 1-chloropentane) and compared with previously investigated chloromethane. Regardless of the parent chloroalkane, measured kinetic energy distributions (KEDs) of chlorine photofragments exhibit a single peak at energy around 0.8 eV. Photodissociation of higher chloroalkanes involves a recoil of a semi-rigid alkyl fragment, whose internal energy absorbs 40-60% of the total available energy. For chloromethane, however, only less than 10% of the available energy goes into the alkyl fragment excitation. Measured results of the energy partitioning are compared with calculations based on classical impulsive models. VMI experiment in combination with theory also yields information about the nature of electronic transition and probability of the intersystem crossing. Analysis indicates that the direct absorption into the triplet state is more probable for the chloroalkanes with longer chain length, especially for the branched one.