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Comparison between two methods for measuring the sound velocity of shock compressed Al1100 ELI GUDINETSKY, Israeli Atomic Energy Commission, ARNON YOSEF-HAI, EITAN EIDELSTEIN, GABI BIALOLENKER, VITALY PARIS, Nuclear Research Center Negev, ALEX FEDOTOV-GEFEN, MEIR WERDIGER, YOSSEF HOROVITZ, AVI RAVID, Soreq Nuclear Research Center — Sound velocity measurements are an important tool for investigating phase transitions and calibrating the EOS outside the principle Hugoniot. Two common methods are the overtake method and reverse-impact method. Although widely used, there is little discussion about the uncertainties of these methods. A comparison between the aforementioned methods for determining the sound velocity of shock compressed Al1100 is presented. The experiment consisted of an Al1100 flyer plate which was accelerated to velocity of 2.2 km/s towards two Al1100 targets of different thickness backed by a PMMA window and a third LiF target. This experiment was complimented by a second reverse-impact experiment in which an Al1100 flyer plate impacted a LiF target. The similarities of the shock impedance of LiF and Al1100 were used in order to achieve the same pressure in both of the experimental methods. The design of these experiments was led by detailed calculations in order to achieve minimal uncertainties in each experiment. These calculations took into account 2D effects such as edge rarefactions originating in the flyer plate, targets and windows. The uncertainty in the sound velocity is compared to our uncertainty estimate which was based on calculations.

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