A fast-timing experiment was performed at the Argonne National Laboratory between December 2015 and January 2016, with the purpose of measuring the lifetimes of the lowest lying states of nuclei belonging to the deformed regions around mass number A=110 and A=150. The lifetimes of the first excited states are the basic ingredients for quadrupole moment calculations, which give information about the structural evolution that occurs in the deformed areas of the nuclear chart. The nuclei of interest were populated in the spontaneous fission of 252Cf since the maxima of the fragment mass distribution lie approximately in the centre of the regions of interest.

The 252Cf source was placed at the focus of the Gammasphere array (51 HPGe) which was coupled with a fast timing array, comprising 25 LaBr3:Ce scintillator detectors. Each sub-array covered ≈2π of the solid angle. Quadruple events (two gamma rays from Gammasphere and two from the LaBr3:Ce array) were collected for a period of 30 days. LaBr3:Ce scintillator detectors have been extensively used in the past to perform fast-timing measurements thanks to their capability to access the sub-nanosecond regime.

The high energy resolution of HPGe detectors together with the excellent time resolution of LaBr3:Ce detectors, conferred to this hybrid array the right features to perform both fast-timing and spectroscopy measurements. This was the first time that the Gammasphere array was successfully coupled with an array containing such a large number of LaBr3:Ce detectors.

Details of the setup and the digital acquisition system will be given, focusing on the signal processing and the coincidence mechanism. Some preliminary results obtained from 152Eu and 166Ho sources will be shown in order to prove the effectiveness of this arrangement. The status of the analysis for the nuclei 103,105Zr, lying in the first peak of the 252Cf fragment mass distribution, will be presented.