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Introduction of a single-shot electron bunch charge monitor with organic EO Pockels crystals

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We developed a three-dimensional electron bunch charge distribution (3D-BCD) monitor with single-shot detection. The monitor adopts a spectral decoding based Electro-Optic (EO) sampling technique that is non-invasive and enables real-time reconstruction of the 3D-BCD with 30- to 40-fs (FWHM) of noble temporal resolution. These goals are realized by simultaneously probing a number of Pockels EO crystals that surround the electron beam axis with hollow and radial polarized laser pulse. So far, such EO sampling based BCD monitors have been developed by utilizing inorganic EO Pockels crystals such as ZnTe and GaP and their temporal resolutions are limited to ~130 fs (FWHM). In the conference, these above backgrounds are briefly described and we will dedicate to focus on the introduction of organic Pockels EO crystals to the 3D-BCD monitor with some experimental results of feasibility tests and numerical calculations.

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