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2D and 3D calculations in modified Tesla-like cavities

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The poster presents beam properties calculation for the superconducting linear particle accelerator of free electron laser POLFEL[4]. Normalized slice emittance and bunch size are tracked for the 1.6-cell superconducting injector with solenoid followed by 2-structure cryomodules[2] of HZDR-type.

Main results are taken from ASTRA[1] 2D calculations. First the cavity and solenoid were investigated in order to find optimal parameters. The criterion for optimization was normalized slice emittance. After that stage the cryomodules were added and both the beam size and slice emittance were studied.

At this moment 3D calculations are performed for the model using Microwave Studio[3]. We are trying to build a full 3D model of the gun and crymodules with couplers in order to compare emittance from both 2D and 3D modelling.

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Time-resolved SAXS studies of morphological changes in a blend of linear polyethylene with homogeneous ethylene-1-octene copolymer

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The understanding of the phase behavior of polyethylene (PE) blends is of great commercial importance because in the polyethylene industry, different types of polyethylenes are often blended together to meet various kinds requirements of processing and final products. It is common to blend a high density PE (HDPE) with zero or very low short-chain branch concentration and poly(ethylene-α-olefin) copolymers with high short-chain branch concentration and highly regular (homogeneous) distribution of these branches. The homogeneous copolymer increases the toughness and impact strength of the blend, while HDPE enables the blend to maintain good tensile properties.

It is well established that the mechanical properties of semi-crystalline polymers are closely related to their crystalline morphology. Despite more than a decade of studies of the morphologies of polyethylene blends, a little is known about the crystallization characteristics of the HDPE and poly(ethylene-α-olefin) blends. Hence, in the present paper isothermal melt crystallization in the blend of HDPE and a homogeneous copolymer of ethene-1-octene was studied by time-resolved synchrotron small-angle X-ray scattering (SAXS). The SAXS profile was analyzed both by correlation, $\gamma(r)$, and interface distribution, IDF, functions. These functions allow for determination the values of the long period (LP), the crystalline and amorphous layer thickness (L_C and L_A respectively) and the local volume fraction crystallinity (Φ_L). The chosen isothermal crystallization temperatures covered a wide range of temperature, during which a different mechanisms of crystallization have been observed.