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Monochromatization Interaction Region Optics Design for Direct s-channel production at FCC-ee

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One of the most fundamental measurements since the Higgs boson discovery, is its Yukawa couplings. Such a measurement is only feasible, if the centre-of-mass (CM) energy spread of the e^+e^- collisions can be reduced from ~ 50 MeV to a level comparable to the Higgs boson's natural width of ~ 4 MeV. To reach such desired collision energy spread and improve the CM energy resolution in colliding-beam experiments, the concept of a monochromatic colliding mode has been proposed as a new mode of operation in FCC-ee. This monochromatization mode could be achieved by generating a nonzero dispersion function of opposite signs for the two beams, at the Interaction Point (IP). Several methods to implement a monochromatization colliding scheme are possible, in this paper we report the implementation of such a scheme by means of dipoles. More in detail a new Interaction Region (IR) optics design for FCC-ee at 125 GeV (direct Higgs s-channel production) has been designed and the first beam dynamics simulations are in progress.

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Footnotes

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Yes

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